PRELIMINARY PLANT ASSOCIATIONS
OF THE SISKIYOU MOUNTAIN PROVINCE

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INTRODUCTION

Purpose and Scope

The objective of the Area Five Ecological Program is to classify Forest Service administered lands. This is being accomplished in two phases. This publication is a result of phase one, floristic classification and description. Phase two, the predictive phase, will provide plant response information such as growth, yield, successional pathways, and potential productivity. Field work on phase two begins Spring of 1984.

The purpose of this project is to classify, i.e., separate into units of similar vegetation composition and management response, the Siskiyou Mountain Province of Area Five. Area Five includes all Forest Service lands of the Rogue River, Siskiyou, and Umpqua National Forests. The Siskiyou Mountain Province is the Siskiyou National Forest, the Applegate District, and the west half of the Ashland District. All lands, except a portion of the Powers District, are within the Klamath Geological Province (Figure 1).

This publication is the first approximation of the plant associations in the Siskiyou Mountains. It is intended for interim use. Some associations will be combined or split for the final guide, based in part on feedback from the user. Therefore, it is essential that each individual evaluate the utility of these associations and provide feedback to the authors.

Definitions

CLIMAX is the end point of succession (the same as potential natural vegetation) where neither plant composition nor stand structure changes. Net productivity in terms of biomass production is considered to be zero.

The ASSOCIATION is used to resolve environmental differences for silvicultural prescriptions. It can also be used to evaluate productivity, management results, and to extrapolate biological response. It is the finest level in the classification hierarchy.

A SERIES is an aggregation of plant associations with the same climax dominant(s). The Jeffrey Pine Series, for example, consists of associations in which Jeffrey pine (*Pinus jeffreyi*) is the climax dominant. The series level is broad and may be used as a planning tool where project-level resolution is not needed.

Concepts

National direction recommends that associations be based on climax species, i.e., potential natural vegetation; and where necessary for further resolution, site variables such as slope, aspect, or soil may be used as qualifiers. This project is consistent with that direction. Associations are based on potential vegetation and site characteristics; however, some are based on management considerations such as regeneration difficulty or site productivity.

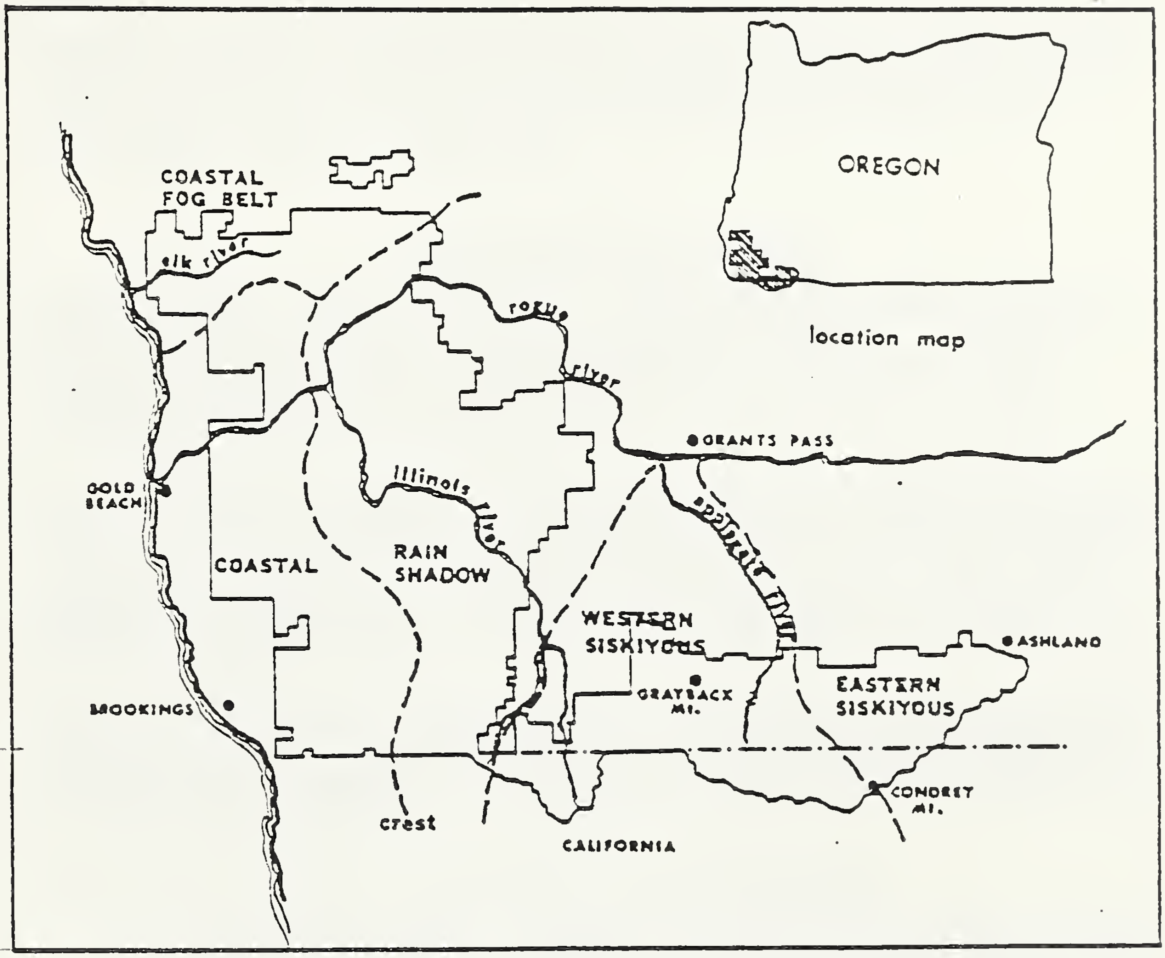

Figure 1. Portion of Area 5 covered by this guide showing the broad climatic regimes of the Siskiyou and Coastal Mountains. The eastern and western Siskiyous are divided according to Waring (1969).

Potential natural vegetation is essentially synonymous with climax vegetation. Since there is little to no climax vegetation in Area Five, we have sampled the oldest, undisturbed (where possible) stands and infer climax from the structure and composition of the regeneration layer.

Intensive statistical methods have been used to determine the "natural" classes in the data. Details of these methods are not appropriate for this document but can be obtained at the Siskiyou National Forest Supervisor's Office in Grants Pass.

How to Use Association Keys

A key is a gross simplification of a classification; there are stands that are difficult to key or do not key satisfactorily. When this occurs, pick the most appropriate association. Similar or closely related associations will key out near each other and will respond similarly to management alternatives.

A classification is composed of abstract groups or discrete classes; in this case, the associations are based on samples taken across continuous terrain. Ecotonal stands are difficult to key. In all cases check the association summaries and constancy tables for average, range, and general descriptions before making a final selection. This should be done while in the field.

The key is intended for sequential use. Always start at the beginning. The first clue in each of the dicotomies is the most discriminatory; give that the most weight, but consider all clues in both dicotomies as you move through the key.

The following steps will be helpful in using the keys.

1. Be sure the stand is uniform. Do not select, for instance, a site which is half serpentine and half granitics; or half old growth and half cutover. The site should represent the stand.

2. Make a species list and occularly estimate their vertical ground cover by mentally dividing a 1/5 acre plot into quarters, eighths, etc.

3. Use the species list and cover values to make a preliminary identification. Where possible presence/absence is used in the key, but cover estimates are often necessary supplements; they will also help when checking the values in the association summary.

4. Check the association description and constancy tables to see that they resemble the plot and stand. The key and descriptions should fit field conditions between 70 and 80 percent of the time.

Keying to Association on Disturbed Sites

Although the Key to Associations was constructed to identify stable vegetation, i.e., stands of 100 years or older, users have expressed a need to identify the association on a recently harvested site. Seral stages will be described in the final guide, but until then, follow this suggested procedure.

1. If the area is not uniform, i.e., it has both north and south slopes or it has two parent material types, stratify and key both areas or identify the most extensive area and key it. If you are keying to identify associations with reforestation difficulties, key the area that you perceive to be the most difficult to reforest; that way the prescription will succeed for the entire unit. Be sure that the area is of great enough proportion to warrant increased effort and resources.

2. To find plants that characterize the site (key plants), use islands of undisturbed vegetation. If all areas have been disturbed, use the area with the least disturbance. Research in southwestern Oregon indicates that areas that have been clearcut and burned still have about 65 percent of the original species present within two years after burning, but with greatly reduced cover. After about five years, sprouters and pioneers will dominate. If the site has been cut, burned, and scarified, look for "key" plants around stumps.

3. Adjacent stands can be used to check your decisions and in some cases to key the harvested site. If you are attempting the latter, be sure that the adjacent stand is on the same aspect, slope, parent material, soil, etc.

4. You should already be in the habit of reading the association description to help make your final choice. There are priorities (similar to those identified in "How to Use Indicators") to follow in this process. Understory concurrence is most important. That is, the list of understory species present should match the association description quite well (not perfect). Be sure to check the constancy table (blue pages) for the complete species list. Next, the environmental description and shrub composition should match. Herbaceous species are often of some help but the "general description" is not often much help.

5. Experience over the range of conditions is most useful. It will often be very difficult for a newcomer to key in the Siskiyou Mountain Province. When possible get help from personnel who have had experience using the key, or the authors.

How to Use Indicators

These six concepts for using indicators are interrelated and should be considered together. If they are used separately, we suggest the hierarchy in which they appear. At this time, their use is an art. In the final guide we plan to use regression analysis to make their use more of a science.

Indicators which seem to conflict are often found during site evaluation. By using all the concepts, those which are most representative of the site can be determined.

1. Number of Plants — Shakespeare once said "one plant does not an indicator make [sic]." Consequently one poison oak plant does not automatically mean the site is dry and that regeneration will be a problem.

2. Absolute Cover — In most instances 20 percent cover of poison oak is a better indicator of hot surface soils than is 10 percent cover. However, it does not mean that the soil condition is twice as severe.

3. Correspondence — Look for corresponding indicators, whether plant or environmental. Hairy honeysuckle and poison oak are both indicators of hot dry conditions, for instance. If both occur, they strengthen the interpretation and errors are less likely. Shallow soil and high coarse fragment content should also be found on these sites. Consequently, the environmental conditions "correspond" with the plant indicators.

4. Spatial Distribution — If the indicator used is bunched in one corner of the area being evaluated (not evenly distributed) it is not indicative of the site; either stratify the site or accept the included variation. An indicator should be well distributed. Herbs, because of their size, are only indicators of a microsite. Beware, however, of sensitive herbs which can indicate more general conditions.

5. Temporal Distribution — As a general rule longer lived species are better indicators of the environment. Trees, for example, must live through extremes and therefore indicate the species which are appropriate for regeneration. Annuals, at the other extreme, are dependent only on the conditions existing during germination and are not indicative of long term conditions.

6. Sensitivity

Some species are more sensitive than others. Douglas-fir, for example, will grow anywhere; as will rattlesnake plantain. But others are restricted and make good indicators. Darlingtonia, for example, is totally restricted to sites with running water; if the running water was not obvious, darlingtonia would be a good indicator of running water.

Key to the Series of the Siskiyou Mountain Province

1a Western redcedar, coast redwood, and understory western hemlock present 2

2a Western redcedar present . . . . THPL (p110)

2b Western redcedar absent 3

3a Coast redwood present SESE2 (p151)

3b Coast redwood absent . . . . TSHE (p110)

1a Western redcedar, coast redwood, and understory western hemlock absent 4

4a Mountain hemlock present; white fir absent . . . . TSME (p22)

4b Mountain hemlock absent; if present, then white fir present 5

5a Jeffrey pine present in overstory and dominant in understory; serpentine or peridotite parent material, sometimes with no understory tree species . . . . PIJE (p265)

5b Jeffrey pine absent if present then not dominant in understory; may be ultrabasic parent materials, but other characteristics not as above 6

6a Lodgepole pine cover combined from both layers greater than 50%; Pacific rhododendron absent . . . . PICO (p277)

6b Lodgepole pine absent, present in only one layer, or combined total less than 50% 7

7a Western white pine in overstory greater than 50% cover, present and dominant in undestory, and beargrass cover greater than 50%; usually above 5500 feet . . . . PIMO (p22)

7b Western white pine absent or subordinant to other tree species in the understory . . . 8

8a Shasta red fir present 9

9a Shasta red fir cover greater then any other understory tree species (i.e., dominant) . . . . . ABMAS (p22)

9b Shasta red fir cover less than at least one other understory tree species . . . . ABCO (p49)

8b Shasta red fir absent 10

10a Port-Orford-cedar usually present in the overstory, and is the dominant understory species; often along stream channels, in concavities, or in moist ultrabasic parent material situations . . . . CHLA (p135)

10b Port-Orford-cedar absent, or present and not as above . . . 11

11a White fir dominant in understory . . . . ABCO (p49)

11b White fir absent or subordinant in understory 12

12a Tanoak dominant in understory LIDE3 (p153)

12b Tanoak absent or subordinant in understory 13

13a Douglas-fir dominant in understory . . . . PSME (p206)

13b Douglas-fir absent or subordinant in understory 14

14a Ponderosa pine dominant in understory . . . . PIPO (p206)

14b No tree species present in either overstory or understory; elevation greater than 6000 feet . . . ABMAS (Sheep assoc. or meadow) (p22)

Table 1: Association Occurrence by District

	ASH	APP	IV	GAL	GB	CHT	POW
TSME/POPU	+	+					
ABMAS/Sheep	+	+	?				
ABMAS/POPU	+	+	?				
ABMAS-QUSA		-	+				
ABMAS/SYMO	+	+	+	?			
PIMO/XETE	-	+	?				
ABCO-ABMAS/RIBES	?	?	+				
ABCO-ABMAS/ROGY	-	?	+	?			
ABCO-ABMAS/SYMO	+	+	+	?			
ABCO-QUSA/CHUM		+	+	+	?		
ABCO-QUSA/BENE-PAMY		-	+	-	?		
ABCO-QUSA/BENE		-	+	+	-		
ABCO-QUSA-CACH	+	+	+	+	?		
ABCO-CHNO		+		+			
ABCO-PIBR/VAME		+	+	?	?		
ABCO-PIBR/GAOV		-	+	?			
ABCO-PIBR/CHUM		-	+	+	?		
ABCO-LIDE3		-	+	+	-		
ABCO-TABR	-	+	-	-	?		
ABCO-CHLA			+	?	?		
ABCO-PSME	-	+	-	?			
ABCO/BENE	-	+	+	-	?		
ABCO-ACGL	+	-	-				
ABCO/Herb	-	+	+				
ABCO-CHLA/Depauperate			+	-			
ABCO-PSME/BENE	+	+	+	?	-		
ABCO-PSME/Depauperate	+	?	-	?			
ABCO-PSME/HODI	+	-	-	-			
ABCO-PIPO	+	-	-	?			
ABCO/SYMO	+	+	+	?			
TSHE-ABCO				+	?		
TSHE-THPL						+	+
TSHE-THPL/High elevation				+	?		
TSHE-QUSA			+	?	+		
TSHE-CHLA			?		-		+
TSHE/GASH			-		-		+

\+ Most occurrences of the association are on the District(s) indicated.

\- The association occurs on the District(s), but not as often as the above.

? The association may occur on the District(s), but was not sampled there.

	ASH	APP	IV	GAL	GB	CHT	POW
TSHE/RHMA						-	+
TSHE-UMCA					-	+	+
LIDE3-TSHE					+	-	+
CHLA/BENE/ACTR			+	?			
CHLA/GASH			+		-		-
CHLA/BENE/LIBOL			+	-	?	?	
CHLA-QUVA			+	?			
CHLA/GABU					?	+	
CHLA-ACMA			+	?	?		
LIDE3-SESE2						+	
LIDE3/VAOV2-GASH					+	+	?
LIDE3/VAOV2					+	+	?
LIDE3-UMCA					+	-	-
LIDE3/RHMA				?	+	+	
LIDE3/RHMA-VAOV2				?	+	+	?
LIDE3/RHMA-GASH				-	+	+	-
LIDE3/GASH			?	-	+	+	
LIDE3-CHLA				-	+	?	
LIDE3/RHCA			+	?	?	+	-
LIDE3/GASH-RHMA			+	?	-	-	?
LIDE3/GASH-BENE			+	+	?	?	?
LIDE3-ACCI			+	-	-		
LIDE3-ABCO-ACCI			+	-	?		
LIDE3-ABCO			+	-	?		
LIDE3/BENE			+	+			
LIDE3/BENE-RHDI			+	+			
LIDE3-QUCH			+	+	?		
LIDE3-QUCH/BENE			+	+	?		
LIDE3/RHDI-LOHI			+	+	-		
PSME-ABCO-PIJE	+	-	-				
PSME-ABCO	-	+	-				
PSME-ABCO-PIPO		+	?	-			
PSME-ABCO/HODI	-	+	-	-			
PSME-ABCO/BENE	-	+	+	-			
PSME/RHMA			-	-	+	-	-
PSME-LIDE3/GASH			-	+	-		
PSME-LIDE3-PILA			?	+			
PSME-LIDE3/RHDI			-	+			
PSME-LIDE3			+	+			
PSME-LIDE3-QUCH			+	+	-		

	ASH	APP	IV	GAL	GB	CHT	POW
PSME-QUSA			+				
PSME/BERE	+						
PSME/BENE		+	-				
PSME/RHDI-BEPI		+	-	?	?		-
PSME/RHDI	+	-	-	+	+		
PSME-PIPO	?	+					
PSME/Depauperate	+	-	-	-			
PSME/PIJE		-	+	?	-		
PIPO-PSME	-	+					
PICO	?	+	+		?		?
PIJE-PIMO	-	-	+	-	-		
PIJE-QUVA		-	+	+		-	
PIJE/CEPU			+	-			
PIJE/Grass			+	+			
PIJE/FEID	?	+	?				

Table 2: District Averages for Various Environmental and Herbaceous Variables

District	Num. # of Plots	Elev. (ft)	% Slope	Soil Depth (in)	% Bare Ground	% Surface Rock	% ABCO Const	% TSHE Const	% SHRUB Cover	% HERB Cover	% GRASS Cover
Applegate	182	4575	42.7	37.1	6.8	14.0	74	--	40	42	4
Ashland 1/	129	4976	39.5	36.5	7.2	5.5	70	--	30	41	1
Chetco	82	1615	36.3	41.7	3.1	6.9	--	17	76	18	1
Galice	147	2927	46.3	33.3	4.2	8.3	28	3	42	20	5
Gold Beach	93	2226	35.2	39.8	2.6	3.9	11	14	83	16	6
Illinois Valley	320	3863	36.0	34.6	3.6	14.9	64	1	35	31	4
Powers	43	1930	49.9	39.8	1.9	7.6	--	84	69	39	1
TOTAL	996	3578	39.8	36.4	4.5	9.9	48	7	45	30	4

1/ Only west side represented.

How to Use the Summary

COMMON NAME
CODE Sample Size

EXTENT: Look at first, the association may not occur in your area.

ENVIRONMENT:	AVG SD RANGE	GENERAL DESCRIPTION
Elevation (ft)	These statistics are developed from plot data. A species or association may be found that exceeds the range.	These are surface and topographic descriptors not easily averaged but give the general look of the site. The surface variables are given in % ground cover.
Aspect (deg)		
Slope (%)		
Soil Depth (in)	Soil pits were often excavated to only 50 inches on deeper soils.	
Total BA (ft^2)	All species including hardwoods were measured.	

VEGETATION: (See page ___ for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory The oldest and tallest canopy layer species **Tree Understory** A layer of trees under the overstory, ususally younger; may not be present. **Shrub, Herb & Grass** Lifeform defined by Garrison et al. (1976).	The cover of the species divided by the number of occurrences within the Association.	The number of occurrences in the Association divided by the number of plots in the Association.	Indications may be specific to the association and/or series. For example, salal (GASH) on coastal sites often indicates drier conditions, whereas on inland sites it often indicates moist sites.

DISCUSSION: A combination of comments about the site, species, and management considerations.

# TOTAL SISKIYOU SUMMARY
N = 996

EXTENT: Ashland to Powers Districts, Siskiyou and Rogue River National Forests.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	3578	1456	140-7300	Litter Avg = 84% ± 23
Aspect (deg)	189	114	0-360	Moss Avg = 16% ± 27
Slope (%)	40	20	0-120	Bareground Avg = 5% ± 10
Soil Depth (in)	36	15	0-110	Surface rock Avg = 10% ± 18
Total BA (ft^2)	283	140	0-800	

VEGETATION:

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	85	47	Ubiquitous, seral
white fir (ABCO)	28	35	Decreasing with stand management
sugar pine (PILA)	10	30	Great growth on moderate sites
ponderosa pine (PIPO)	15	15	Can be used more
incense-cedar (CADE3)	10	12	A promising generalist
Port-Orford-cedar (CHLA)	23	8	Tolerant as long as there is water
western hemlock (TSHE)	31	3	Might be limited by historic disturbances
Tree Understory			
Douglas-fir (PSME)	13	59	Recognized generalist
white fir (ABCO)	21	48	Increasing with more efficient fire control
tanoak (LIDE3)	36	43	Acts as both pioneer and climax
Pacific madrone (ARME)	11	31	Fire related
canyon live oak (QUCH)	12	29	Shallow soils and disturbance
golden chinquapin (CACH)	12	25	Poor sites on ridges
incense-cedar (CADE3)	6	19	Slow growth but resistant
sugar pine (PILA)	4	19	Greater growth, uniform wood
western hemlock (TSHE)	33	7	Increasing without fire
ponderosa pine (PIPO)	7	6	Decreasing with more efficient wildfire control

THE MOUNTAIN HEMLOCK SERIES

The Species

Mountain hemlock (*Tusga mertensiana*) occurs at an average elevation of 5720 feet in the Siskiyou Mountain Province. Ninety percent of it occurs above 5000 feet, but it has been found as low as 3700 feet. It occurs on Mt. Ashland associated with subalpine fir (*Abies lasiocarpa*) above 7200 feet and more extensively on flatter peaks such as Condrey Mountain. It dominates the occasional glaciated, cirque-like depressions along the north slopes of the Siskiyou backbone. Its presence and cover have a slight negative correlation with slope ($r = -.38$), i.e., the denser stands are on the gentler slopes. It occurs on soils that average 37 inches in depth, which is about average for Forest Service administered lands in the Province.

The Series

The average elevation for the Mountain Hemlock Series is 6189 feet, slightly higher than the species average. Shasta red fir (*Abies magnifica shastensis*) competition limits the lower elevational extent of the Series. Shasta red fir seems to be more of a generalist and where the two species occur, Shasta red fir dominates all but the coldest sites.

Only one association is identified in the Mountain Hemlock Series: the Mountain Hemlock/Skunkleaf Polemonium Association. It is species poor, as are the mountain hemlock associations in the Cascade Mountain Province. Although the Series has high basal area, diameter and height growth are extremely slow. Mean annual increment in Cascade associations produce between 14 and 64 cubic feet per acre (Hopkins 1976, Volland 1976). In the mountain hemlock stand north of Mt. Ashland the mean annual increment is 14 cubic feet per acre (Waring, unpublished data).

Artificial regeneration is possible but the timing is critical. Planting should closely follow snowmelt, sometimes as late as July. Naturals seed quite well on small cuts in the Cascades (Atzet & Means, unpublished data). Large cuts are more difficult to regenerate, but in both cases the regeneration period will often be greater than five years.

Mountain Hemlock Association

*mountain hemlock / skunkleaf polemonium TSME/POPU
Tsuga _mertensiana_ / _Polemonium_ _pulcherrimum_ p16

*Keyed with the Shasta red fir associations.

MOUNTAIN HEMLOCK/SKUNKLEAF POLEMONIUM
TSME/POPU N = 7

EXTENT: Applegate and Ashland Districts above 5500 feet.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	6189	335	5880-6720
Aspect (deg)	32	61	N-SE
Slope (%)	33	22	5-68
Soil Depth (in)	41	14	18-50+
Total BA (ft^2)	410	193	120-600

GENERAL DESCRIPTION

Occurs on schists, granitics and metamorphics; northern tending cirques and slopes. Bareground and rock each average 11%. Fine litter is high and moss is low at 5%.

VEGETATION: (See page 17 for complete table) (See Shasta Red Fir Series for key)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
mountain hemlock (TSME)	59	100	Climax, poor growth
Shasta red fir (ABMAS)	16	57	Seral, fair growth
Tree Understory			
mountain hemlock (TSME)	44	100	Best for north slope regeneration
Shasta red fir (ABMAS)	2	43	Best for south slope regeneration
Shrub, Herb & Grass			
broad-leafed arnica (ARLA)	14	43	Indicates where Shasta red fir will do well
skunkleaf polemonium (POPU)	6	57	
Sitka valerian (VASI)	2	57	

DISCUSSION: Both Shasta red fir and mountain hemlock are appropriate for regeneration efforts on all sites. Shasta red fir will produce more biomass per tree, particularly where broadleaf arnica (Arnica latifolia) is found. Shasta red fir is more appropriate for south slopes and large openings. On small, unburned openings mountain hemlock naturals will occur heavily. Large openings and harsh treatment of the soil surface, will lengthen the establishment period.

The most limiting factor for survival and growth is soil temperature. Youngberg (unpublished data) measured a soil temperature of 40°F at 8 inches on September 30 under a mountain hemlock stand north of Mt. Ashland. The low viscosity of water at that temperature restricts uptake.

While these stands provide thermal and hiding cover for wildlife, they produce little to no forage. Deer may use them as travel routes to areas with higher herbaceous cover.

TABLE 3: CONSTANCY TABLE FOR MOUNTAIN HEMLOCK ASSOCIATIONS

	TSME/POPU	
Number of Samples	7	
	Cons[1/] (%)	Mean[2/] (%)
ENVIRONMENT:		
ELEV	100	6189
ASPECT	100	32
SLOPE	100	33
TODPTH	100	41
TOTBA	100	410
TREE OVERSTORY:		
TSME	100	59
ABMAS	57	16
TOTALO	100	67
TREE UNDERSTORY:		
TSME	100	44
ABMAS	43	2
TOTALU	100	45
SHRUBS:		
RIVI	14	1
TOTALS	100	T

TABLE 3 (Cont): CONSTANCY TABLE FOR MOUNTAIN HEMLOCK ASSOCIATIONS

	TSME/POPU	
Number of Samples	7	
	Cons	Mean
HERBS:		
POPU	57	6
VASI	57	2
ARLA	43	14
ARMA3	43	2
OSCH	29	2
ORCR	29	1
PYPI	29	1
PYSE	29	1
VIGL	29	1
VAHE	14	20
LULE	14	3
VECA	14	3
ACMI	14	1
COMA3	14	1
CRPL	14	1
ERGR	14	1
ERLA	14	1
HIAL	14	1
HYDRO	14	1
HYFEA	14	1
MAMA	14	1
MOSI	14	1
TOTALH	100	18

TABLE 3 (Cont): CONSTANCY TABLE FOR MOUNTAIN HEMLOCK ASSOCIATIONS

	TSME/POPU	
Number of Samples	7	
	Cons	Mean
GRASSES:		
CAPES	57	1
CAREX	29	2
FESU	14	1
TOTALG	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE SHASTA RED FIR SERIES

The Species

Shasta red fir (Abies magnifica shastensis) is a taxon intermediate to red fir (A. magnifica magnifica) and noble fir (A. procera). These taxa are not often distinguishable. We follow Franklin et al. (1978) in calling the individuals of this locale Shasta red fir; most have intermediate cone and needle features but occasional specimens may strongly resemble noble fir. It is not silviculturally important to distinguish between them. It is important to follow good seed management and seedling placement practices.

The species ranges in elevation from 3800 to 7300 feet with an average of 5380 feet. Overstory cover is positively correlated with elevation ($r=.52$); but understory cover is less correlated ($r=.25$), consequently the amount of understory cover is inversely related to that of the overstory. Therefore, it seems tolerance increases with elevation. Although it is very shade tolerant, it also performs well in full sunlight. Shasta red fir occurs more often on northerly aspects but occurs equally on all slopes. It occurs on soils averaging 37 inches, the Siskiyou average, and a wide variety of parent materials.

The Series

The Shasta Red Fir Series also ranges in elevation from 3800 to 7300 feet and averages 5936 feet. It is most often found on northerly aspects and increasingly so at lower elevations. It occurs, as does the species, on average Siskiyou Mountain soil and slope conditions. One of the associations is outstandingly different, the ABMAS/Sheep Association.

Shasta Red Fir Associations

Key to the Mountain Hemlock, Shasta Red Fir, and Western White Pine Associations

1a Western white pine cover in overstory greater than 35%; beargrass cover greater than 50% . . . . PIMO/XETE (p40)

1b Western white pine absent in overstory; if present, then less than 35% (15%) cover; beargrass cover less than 50% (15%) 2

  2a Mountain hemlock present 3

    3a Sadler oak absent, mountain hemlock greater than 50% cover . . . . TSME/POPU (p16)

    3b Sadler oak and one-sided pyrola present . . . . ABMAS-QUSA (p26)

  2b Mountain hemlock absent or less than 1% cover 4

    4a Sadler oak present . . . . ABMAS-QUSA (p26)

    4b Sadler oak absent 5

      5a White fir present, shrub cover usually greater than 15%, snowberry usually present . . . . ABMAS/SYMO (p27)

      5b White fir usually absent or low in cover 5

        6b Shasta red fir present, herb cover medium with skunkleaf polemonium present . . . . ABMAS/POPU (p25)

        6b Shasta red fir scattered or no tree cover, forest soils . . . . . ABMAS/Sheep (p24)

SHASTA RED FIR SERIES SUMMARY
ABMAS N = 64

EXTENT: High elevation, mostly eastern Siskiyous.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	5936	708	3800-7300
Aspect (deg)	355	91	All
Slope (%)	33	16	0-60
Soil Depth (in)	36	18	12-50+
Total BA (ft^2)	262	183	0-700

GENERAL DESCRIPTION

Litter cover is 75%, moss is 3%, bareground is 13%, and rock is 8%.

VEGETATION: (See page 28 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Shasta red fir (ABMAS)	46	75	Climax
white fir (ABCO)	15	45	Seral
Tree Understory			
Shasta red fir (ABMAS)	25	83	Climax
white fir (ABCO)	8	50	Seral
Sadler oak (QUSA)	24	22	Regeneration competition
Shrub, Herb & Grass			
greenleaf manzanita (ARPA)	21	20	Indicates disturbance, seral
little prince's-pine (CHME)	1	19	Common
western prince's-pine (CHUM)	9	31	Common
creeping snowberry (SYMO)	9	33	Drier sites
baneberry (ACRU)	3	23	Cool, wet indicator
threeleaf anemone (ANDE)	2	25	Cool, moist
broad-leafed arnica (ARLA)	14	30	
bigleaf sandwort (ARMA3)	1	47	Ubiquitous
cleavers bedstraw (GAAP)	3	34	
white-flowered hawkweed (HAIL)	2	44	
mountain monardella (MOOD)	4	25	Common
skunkleaf polemonium (POPU)	3	27	Only on cooler or shaded sites
white vein pyrola (PYPI)	2	27	Cool, moist
one-sided pyrola (PYSE)	3	33	
starry Solomon-plume (SMST)	2	41	Cool, moist
Sitka valerian (VASI)	7	27	Cold, wet indicator
stream violet (VIGL)	2	25	

SHASTA RED FIR/Sheep
ABMAS/Sheep N = 11

EXTENT: High elevation Ashland, Applegate, and possibly eastside Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	6714	208	6400-7100
Aspect (deg)	185	111	All
Slope (%)	28	17	0-60
Soil Depth (in)	18	12	12-50
Total BA (ft^2)	25	44	0-120

GENERAL DESCRIPTION

Tends to occur on upper 1/3 of slope positions from concave to convex topography. Moss is high (7%) for the Series. Bareground averages 17% and rock 5%. This is the only association with erosion pavement and surface gravel (25%).

VEGETATION: (See page 28 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Shasta red fir (ABMAS)	10	27	Climax, will slowly reinvade
Tree Understory			
Shasta red fir (ABMAS)	8	36	Comes in at edges under bitter cherry, manzanita, and buckwheat
Shrub, Herb & Grass			
greenleaf manzanita (ARPA)	15	45	Indicates disturbance, seral
sulpher buckwheat (ERUM)	34	64	Reinvades after disturbance
velvet lupine (LULE)	6	18	Good soil builder
mountain monardella (MOOD)	6	45	Common
skunkleaf polemonium (POPU)	7	27	Only on cooler or shaded sites

DISCUSSION: The ABMAS/Sheep Association, so named because of its probable origin, is seral but so unusual it is given association status. Additionally, because of the extreme degree of disturbance, we do not know which Shasta red fir association, if any, it most resembles. There is a high probability that it is a distinct association, even if left undisturbed for several hundred years.

Before the Hudson Bay trappers entered the area, these sites were probably maintained as "meadows" through the use of fire by Indians. Since most of the areas have forest soils, they have not always been meadows. Soils take thousands of years to develop, therefore, it is likely that the ABMAS/Sheep Association developed as forest and only recently was converted to temporary meadows. According to Rogue River National Forest historical records these areas were intensively grazed between snowmelt and snowfall from the 1870's through 1924. The sheep, numbering in the tens of thousands, vastly depleted the range and lookouts were taught how to distinguish between billowing clouds of dust and forest fire smoke. Since 1924 sheep and cattle have come under increasing control and the sites are slowly reverting to timber along the edges. Since the environment is so extreme, the rate of change is subtle and slow. Differences can be seen by comparing early aerial photos with more recent images.

Environmental characteristics of the ABMAS/Sheep Association, particularly erosion pavement and soil depth, clearly show that much soil and organic matter has been lost from the surface horizons. These sites can be maintained in size and character with fire or grazing, or they can be converted to timbered sites with an extensive program concentrated near the existing edges invaded by Shasta red fir.

SHASTA RED FIR/SKUNKLEAF POLEMONIUM
ABMAS/POPU N = 17

EXTENT: Ashland and Applegate Districts, and possibly Illinois Valley.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	6378	222	5800-6680
Aspect (deg)	357	58	318-178
Slope (%)	30	17	1-60
Soil Depth (in)	38	16	12-72
Total BA (ft^2)	357	111	200-560

GENERAL DESCRIPTION

All slope positions and topography with a strong affinity for north aspects. Litter averages 84%, moss 1%, bareground 16%, and rock 11%.

VEGETATION: (See page 28 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	6	29	Occurs occasionally
Shasta red fir (ABMAS)	55	100	Climax dominant
Tree Understory			
white fir (ABCO)	3	29	Marginal production
Shasta red fir (ABMAS)	29	100	Good production
Shrub, Herb & Grass			
baneberry (ACRU)	2	41	Cool, wet indicator
bigleaf sandwort (ARMA3)	2	71	Ubiquitous
skunkleaf polemonium (POPU)	3	65	Cold, wet indicator
Sitka valerian (VASI)	10	59	Cold, wet indicator

DISCUSSION: This is the coolest of the Shasta red fir associations. There are few alternatives for mixing species during regeneration efforts: Shasta red fir and white fir (*Abies concolor*) are both appropriate, whereas western white pine (*Pinus monticola*) must contend with a high constancy of currant (*Ribes* spp); and neither Douglas-fir (*Pseudotsuga menziesii*) nor mountain hemlock (*Tsuga mertensiana*) are present in this Association.

SHASTA RED FIR-SADLER OAK
ABMAS-QUSA N = 14

EXTENT: Illinois Valley and some Applegate Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	5530	409	4800-6150
Aspect (deg)	344	62	270-110
Slope (%)	36	13	5-50
Soil Depth (in)	41	16	20-72
Total BA (ft^2)	339	114	160-660

GENERAL DESCRIPTION

Occurs mostly on lower 1/3 position of concave slopes. Aspects tend to be northerly. Average litter cover is 93%, moss 2%, no bareground, but 7% rock.

VEGETATION: (See page 28 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	13	79	Good production
Shasta red fir (ABMAS)	48	93	Good production
Tree Understory			
white fir (ABCO)	7	86	Minor climax
Shasta red fir (ABMAS)	21	100	Climax, very shade tolerant
Sadler oak (QUSA)	20	93	Can be planting barrier
Shrub, Herb & Grass			
western prince's-pine (CHUM)	9	71	Common
dwarf blackberry (RULA)	9	57	Occurs with TSME on cooler sites
Sitka mountain-ash (SOSI)	2	43	
thin-leaved huckleberry (VAME)	8	43	Occurs with RULA on cooler sites
vanillaleaf (ACTR)	7	57	
white-flowered hawkweed (HIAL)	2	71	
one-sided pyrola (PYSE)	3	93	

DISCUSSION: Douglas-fir, western white pine, mountain hemlock, white fir, and Shasta red fir are all appropriate species for this Association. They can be considered by site or microsite to maintain species diversity and maximize production. Areas with thin-leaved huckleberry (*Vaccinium membranaceum*) and dwarf bramble (*Rubus lasiococcus*) are appropriate for

mixtures with mountain hemlock and western white pine. Douglas-fir will survive but not produce as much biomass as Shasta red fir and white fir. Sadler oak (Quercus sadleriana) may reduce crop tree growth through competition and may also be a barrier to planting in some cases. This Association occurs mostly on metamorphic material and occasionally on granitics. The granitics are extremely sensitive and care should be taken when dealing with the competitive or physical problems caused by Sadler oak (see discussion of the ABMAS/SYMO Association).

SHASTA RED FIR/CREEPING SNOWBERRY
ABMAS/SYMO N = 15

EXTENT: Applegate, Ashland, eastside Illinois Valley, and possibly Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	5555	489	4560-6480	Occurs on upper 1/3 to mid-slope positions.
Aspect (deg)	158	156	All	Litter averages 79%, moss 3%, bareground 16%,
Slope (%)	35	17	5-58	and surface rock 9%. The warmer, dryer of
Soil Depth (in)	44	18	18-94	the ABMAS associations.
Total BA (ft^2)	348	161	120-700	

VEGETATION: (See page 28 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Shasta red fir (ABMAS)	3	93	Climax
white fir (ABCO)	25	67	Minor climax
Tree Understory			
Shasta red fir (ABMAS)	31	100	Good survival and growth
white fir (ABCO)	12	87	Good growth on lower, drier sites
Shrub, Herb & Grass			
pinemat manzanita (ARNE)	1	7	Indicates disturbance and shallow rocky soils
greenleaf manzanita (ARPA)	2	13	Indicates disturbance
creeping snowberry (SYMO)	11	80	Mostly drier sites

DISCUSSION: This Association is ecotonal between the Shasta Red Fir and the White Fir Series. It represents a variety of environments and can support a variety of species: Brewer spruce (*Picea breweriana*) on the cool, shallow soils; mountain hemlock on the coldest sites; and ponderosa pine (*Pinus ponderosa*) on the hottest, driest sites. Douglas-fir and incense-cedar (*Calocedrus decurrens*) are generalists that can be used on any site in the Association. Sugar pine (*Pinus lambertiana*) can be used on all but the driest and coldest of sites within the Association.

Regeneration efforts have often failed in areas where this Association occurs on granitics. The problem stems from the heat and water holding capacity of the soils. Heat is not readily held by granitics and soil surface temperatures can fluctuate daily from 100°F to freezing. The high temperatures dry out the soil moisture quickly, consequently there is little time in the spring between limiting soil temperatures and soil moisture depletion. Seedlings must be planted after soil temperatures in the rooting zone reach at least 40°F and before moisture becomes limiting. On the extreme sites this "planting window" may only be a few weeks.

Maintaining surface litter is important. It reduces the range of temperature and moisture variation, and is a nutrient source on the relatively unfertile soils. Proper management of soil surface organic material is extremely important in granitics because of their erosive nature. Maintaining organic cover will reduce surface and deep-seated erosion potential.

TABLE 4: CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:								
ELEV	100	6714	100	6378	100	5530	100	5555
ASPECT	100	185	100	357	100	344	100	158
SLOPE	100	28	100	30	100	36	100	35
TODPTH	100	18	100	38	100	41	100	44
TOTBA	100	25	100	357	100	339	100	348
TREE OVERSTORY:								
ABCO			29	6	79	13	67	25
ABMAS	27	10	100	55	93	48	93	43
PIMO	9	8	18	3	14	2	7	3
PSME					36	23	33	19
PILA					14	1	7	1
CADE3					7	1	7	20
TSME					29	27		
TOTALO	100	3	100	57	100	72	100	65
TREE UNDERSTORY:								
PIMO			6	1			7	3
ABCO			29	3	86	7	87	12
TSME			6	1	36	6	7	1
ACGL			6	1	7	1	7	1
ABMAS	36	8	100	29	100	21	100	31

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):								
PREM	18	2	12	2			13	3
CADE3	9	1					13	5
QUSA					93	20		
TSME					29	27		
PSME					14	1	13	1
CACH							13	5
TOTALU	100	3	100	31	100	48	100	43
SHRUBS:								
ARTR	36	12						
SYAL	27	1						
KALMI	9	50						
HAPLO	9	20						
CELE	9	8						
CHNA	9	1						
CEMO	9	1						
SALIX	9	1					7	1
ARPA	45	15	12	5			13	2
RIVE	18	14	6	1			13	1
RICE	9	20	12	5			13	3
SYMO	9	1	24	2	14	3	80	11
LOCO	27	26			36	2	13	1
AMPA	9	1			7	1	13	1
CEVE			6	3	14	2		

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):								
RIBI			18	4	29	2	27	1
RIVI			18	2	21	2	27	2
CHUM			18	1	71	9	47	12
RILO			12	1	7	1	20	2
ROGY			6	3	21	4	20	4
VAME			6	3	43	8	13	2
CHME			6	1	50	1	27	1
ARNE			6	20			7	1
RIBES			6	3			13	2
RICR					14	12		
RILA					7	3		
RISA					7	3		
WHMO					7	3		
LOCI					7	T		
RULA					57	9	7	3
SOSI					43	2	7	3
RIMA					14	6	13	1
BENE					14	2	13	2
LONIC					7	8	7	5
RUPA					7	1	13	41
PAMY					7	1	7	1
HODI							7	3
SARA							7	3
TOTALS	100	31	100	5	100	24	100	25

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:								
CABIB	18	35						
DOHE	18	11						
ORCU	18	6						
POBI	18	6						
RAALA	18	6						
SAOR	18	3						
AGGR	18	1						
ARPU	18	1						
CHDO	18	1						
POLYG	9	20						
BADE	9	9						
PHDI	9	8						
GEMA	9	3						
POSC2	9	3						
ALLIU	9	1						
ARHO	9	1						
CRAC	9	1						
CRPL	9	1						
EREL2	9	1						
FRAT	9	1						
PTAQ	9	1						
SEOR2	9	1						
SPUM	36	26	6	1				
CATO	36	1	6	1				
VECU	18	5	6	1				

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
HADE	18	2	12	26				
ANMA	9	1	6	1				
ARPL	9	1	6	1				
COHE	9	1	6	1				
COPA	9	1	12	11				
LUAL	55	6	12	1			7	20
ACMI	36	2	6	8			40	3
POPU	27	7	65	3			7	3
CAPU	27	2	35	6			7	1
HYFEA	18	35	24	18			20	8
GAOR	18	5	18	44			7	20
AGUR	18	2	6	1			7	3
ERAL	18	1	24	6			27	3
VIAM	9	8	6	20			47	5
ERLA	55	5	12	11	14	6	7	1
MOOD	45	6	12	2	7	3	33	2
GAAP	18	11	18	2	29	1	67	1
SMST	18	1	53	1	43	4	53	2
SETR	18	1	41	3	7	1	7	1
PHHEP	18	1	18	1	14	2	20	7
HIAL	9	3	47	2	71	2	60	2
ARMA3	9	1	71	2	29	1	73	1
VASI	9	1	59	10	21	2	13	2
VIGL	9	1	53	2	14	3	27	2
ARLA	9	1	41	24	14	3	53	11

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
ACRU	9	1	41	2	14	2	33	6
ARCO	9	8			7	95		
ERUM	64	34					7	1
LULE	18	6					7	1
EPAN	18	1					7	1
ERAS	18	1					7	1
GIAG	9	1					7	1
HADI2	9	1					7	1
ORFA2	9	1					7	1
VIPU			24	2				
NEHE			18	7				
SYRE			12	1				
FRPU			6	8				
XETE			6	8				
HYCA			6	3				
SESP			6	3				
CAAP2			6	1				
ERGR			6	1				
MOSP			6	1				
POCA2			6	1				
URDIL			6	1				
DIFO			6	1	7	1		
PYSE			24	2	93	3	27	2
CASC2			18	4	21	3	47	2
PYPI			18	2	71	2	27	2

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Const	Mean	Const	Mean	Const	Mean	Const	Mean
HERBS (Cont):								
PERA			18	2	14	2	13	1
TROV			18	1	43	1	27	2
COMA3			18	1	21	1	27	1
OSCH			12	3	14	5	47	2
ANLY2			12	2	21	1	20	2
SMRA			12	1	43	2	13	2
ANDE			6	3	50	2	53	2
CLUN			6	1	36	2	27	2
GOOB			6	1	36	1	7	1
DIHOO			6	1	7	1	13	1
MOSI			24	2			13	2
MITR2			12	1			33	1
PHCO3			12	1			13	2
CABU2			6	1			7	1
COST2					29	1		
COME					21	1		
PEHO					21	1		
PENST					14	3		
LICA3					14	1		
LIBOL					7	8		
NONE					7	8		
SAXIF					7	3		
LICO3					7	1		
LUPIN					7	1		
PEDE					7	1		

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
PICA					7	1		
SAME3					7	1		
POCA5					7	T		
ACTR					57	7	20	6
PEAN					36	3	13	2
PHAD					14	2	7	3
OSPU					14	1	13	2
FRVEB					7	3	13	2
VAHE					7	1	20	2
HYOC					7	1	13	2
VECA					7	1	13	2
DELPH					7	1	13	1
ADBI							40	1
TRLA2							33	2
ASCA3							20	2
LAPO							20	2
LOTUS							13	2
LUAL2							7	9
LATHY							7	8
ERIGE							7	3
POMU							7	3
SENEC							7	3
TITR							7	3
ARHI							7	1
CORA2							7	1

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
CYOC							7	1
DEPI							7	1
HELA							7	1
LIAP							7	1
LOAMT							7	1
MAMA							7	1
MOPE							7	1
OSOC							7	1
PELE2							7	1
PENE							7	1
POPH							7	1
PYAS							7	1
PYDE							7	1
TOTALH	100	76	100	54	100	32	100	40
GRASSES:								
FERU	9	50						
FEID	9	1	12	2				
SIHY	36	1	12	1				
CAREX	18	3	6	1	14	1	7	2
BRCA	9	8	6	1	7	1	27	2
MESU	9	1			7	1		
FESTU			12	14			7	3
FESU					21	2	13	2
BROMU					7	1		
ELGL							7	2

TABLE 4 (Cont): CONSTANCY TABLE FOR SHASTA RED FIR ASSOCIATIONS

	ABMAS/Sheep		ABMAS/POPU		ABMAS/QUSA		ABMAS/SYMO	
Number of Samples	11		17		14		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES (Cont):								
STOCM							7	2
POA							7	1
ELYMU							7	1
TOTALG	100	10	100	2	100	1	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE WESTERN WHITE PINE SERIES

The Species

Western white pine (Pinus monticola) is found occasionally in many associations and is most common at high elevations and on ultrabasic soils. It is an important component of the Jeffrey Pine Series which occurs exclusively on ultrabasics. It also occurs on granitics indicating a tolerance for a wide range of nutrient regimes.

The species occurs at an average elevation of 4660 feet in the Siskiyou Mountain Province with a lower limit of 2000 feet. Its upper limit is near the top of Red Mountain (7028 feet) on the Applegate District where there are badly deformed specimens. The average soil depth for the species is 25 inches, 11 inches less than the average Siskiyou site. It exhibits a slight affinity for northerly aspects, especially at the lower elevations.

The Series

The Western White Pine Series is similar in many respects to the Mountain Hemlock Series. It occurs at high elevations, on cold soils, is low in productivity, is not widely distributed, and only one association is recognized. It differs significantly in floristic composition and management options primarily because it only occurs on peridotite.

Regeneration in the Western White Pine/Beargrass Association will be extremely difficult. Soils are rocky on and below the surface, shallow, cold, and infertile. Air temperatures are extreme and needle desiccation will be problem. Where soils are shallow, moisture also limits survival and growth. The present stands are reproducing on an uneven age schedule. Most are over 200 years old with no evidence of fire.

Western White Pine Association

*western white pine / beargrass PIMO/XETE
Pinus monticola / Xerophyllum tenax p40

*Keyed with the Shasta red fir associations.

WESTERN WHITE PINE/BEARGRASS
PIMO/XETE N = 4

EXTENT: Applegate, possibly Ashland and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	6353	187	6110-6500
Aspect (deg)	116	39	78-180
Slope (%)	37	20	24-66
Soil Depth (in)	17	6	12-24
Total BA (ft^2)	221	79	105-280

GENERAL DESCRIPTION

On flat to convex peridotite, possibly serpentine, slopes at ridge top or upper 1/3 positions. Litter averages 73% with no bareground or moss. Often in forest/meadow mosaic.

VEGETATION: (See page 41 for complete table) (See Shasta Red Fir Series for Key)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
western white pine (PIMO)	50	100	Probable climax with other species present in overstory
Tree Understory			
western white pine (PIMO)	10	100	Ribes spp. present blister rust problem
Shasta red fir (ABMAS)	2	50	Good wildlife tree
white fir (ABCO)	1	50	On better sites
mountain hemlock (TSME)	8	25	Mostly northeast aspects, slow growth
Shrub, Herb & Grass			
common yarrow (ACMI)	1	100	Indicates past or present grazing (increaser)
beargrass (XETE)	73	100	Serious planting barrier
sedge (CAREX)	2	50	Will spread with ground disturbance

DISCUSSION: The forest structure is open. There is not much hiding or thermal cover, but a thick cover of beargrass (*Xerophyllum tenax*) with rodent trails throughout. This Association provides rodents, winds, and perch trees for raptors. Timber production is poor. As in many high

elevation associations, basal area is adequate but height growth is extremely poor. Historically this Association has been over-used by sheep. There are several sensitive species in this Association, for example: Shasta fern (*Polystichum mohriodes*), many-flowered lewisia (*Lewisia leana*), and broad-scaled owl-clover (*Orthocarpus cuspidatus*).

TABLE 5: CONSTANCY TABLE FOR WESTERN WHITE PINE ASSOCIATION

	PIMO/XETE	
Number of Samples	4	
	Cons[1/] (%)	Mean[2/] (%)
ENVIRONMENT:		
ELEV	100	6353
ASPECT	100	116
SLOPE	100	37
TODPTH	100	17
TOTBA	100	221
TREE OVERSTORY:		
PIMO	100	50
ABMAS	25	3
ABCO	50	2
TSME	25	20
TOTALO	100	57
TREE UNDERSTORY:		
PIMO	100	10
ABMAS	50	2
ABCO	50	1
TSME	25	8
TOTALU	100	13

TABLE 5 (Cont): CONSTANCY TABLE FOR WESTERN WHITE PINE ASSOCIATION

	PIMO/XETE	
Number of Samples	4	
	Cons	Mean
SHRUBS:		
ARNE	75	1
AMPA	50	2
CHUM	25	1
RIBI	25	1
TOTALS	100	2
HERBS:		
XETE	100	73
PERA	100	3
ARMA3	100	2
ERAL	100	2
ACMI	100	1
VIPU	75	3
ANDE	75	1
CAAP2	75	1
MITR2	75	1
OSCH	75	1
AQFO	50	5
LIPEL	50	2
ARCO	50	1
CATO	50	1
CRPL	50	1
LUAL	50	1
MOOD	50	1
POSC2	50	2
ERLA	25	8
PHDI	25	8
POGL	25	2
ALLIU	25	1

TABLE 5 (Cont): CONSTANCY TABLE FOR WESTERN WHITE PINE ASSOCIATION

	PIMO/XETE	
Number of Samples	4	
	Cons	Mean
HERBS (Cont):		
ANDR	25	1
ANMA	25	1
ARNU	25	1
ASDE	25	1
CHDO	25	1
COHE	25	1
CORA2	25	1
EPMI	25	1
ERGR	25	1
ERUM	25	1
GENTI	25	1
HAUN	25	1
IRCH	25	1
LELA	25	1
LILE	25	1
LUBI	25	1
LULE	25	1
ORCU	25	1
ORUN	25	1
PENST	25	1
PEPA3	25	1
PHHEP	25	1
POQU	25	1
SEIN	25	1
SELA2	25	1
SEOR2	25	1
SICA2	25	1
THFE	25	1
VASI	25	1

TABLE 5 (Cont): CONSTANCY TABLE FOR WESTERN WHITE PINE ASSOCIATION

	PIMO/XETE	
Number of Samples	4	
	Cons	Mean
HERBS (Cont):		
VIAD	25	1
VIAM	25	1
VIGL	25	1
TOTALH	100	105
GRASSES:		
CAREX	50	2
BROMU	25	1
FEID	25	1
STOCM	25	1
TOTALG	100	.2

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE WHITE FIR SERIES

The Species

White fir (Abies concolor) has a broad ecological range. It occurs throughout the Sierras and sporadically in the southern Rocky Mountains. It is common in the Pacific Northwest and locally occurs on all Siskiyou Mountain Province Ranger Districts. It is less common on coastal Districts where its occurrence is limited to concave bottomlands. These low lying coastal populations are anatomically similar to grand fir (A. grandis) and may occasionally cross with white fir. Mixing of the two species is common in southwestern Oregon. Most trees have intermediate characteristics and are not distinguishable. Because most local foresters call our species white fir (A. grandicolor [sic]), we are following that precedent.

In the Siskiyous, white fir ranges in elevation from 800 to 6700 feet with an average of 4470 feet. Although the range may seem wide, approximately 67 percent of the white fir plots occur within a 1400 feet band around the mean (i.e., one standard deviation is 700 feet). Generally white fir occurs more often and with greater cover on northerly aspects; it occurs on soils averaging 38 inches in depth.

The Series

Because the Series is so variable, management generalizations cannot be made. White fir - Shasta red fir associations occur on cold, wet sites that may be cold enough to limit Douglas-fir (Pseudotsuga menziesii) growth. The White Fir - Ponderosa Pine Association, on the other hand, is dry and moisture is often the limiting factor. White fir - Brewer spruce associations occur in a very specific environment.

The White Fir - Brewer Spruce Associations were separated from other white fir associations because the combination of parent materials, elevation, and local climate produce a unique environment and therefore a unique floral composition and structure. Sixty-six percent of these plots are on hard metavolcanics; the remainder are on granitics. The latter produce some of the most infertile soils in the Siskiyou province. Unlike ultrabasic soils, which are imbalanced and slightly toxic, these are low in essential elements. The hard, weather resistant metavolcanics have produced an average soil depth of 32 inches, four inches shallower than the Siskiyou average. Surface rock (15%) is also higher than the average Siskiyou site (10%).

Elevation tends to offset the negative effects of the parent rock by increasing orographic precipitation, particularly during summer, and lowering ambient air temperatures. In addition, local topography tends to trap moisture as fog and increase humidity. Together the effect is the reduction of evapotranspirational demand. Thus, Brewer spruce can compete well where soils are infertile, cool, and transpiration is low; but as this delicate balance tips, other species gain the advantage.

The White Fir - Alaska-cedar Association habitat is unique. Such sites often contain sensitive species. Accordingly, it is given association status although it is very rare.

White Fir Associations

white fir - Shasta red fir / currant ABCO-ABMAS/RIBES
Abies concolor - A. shastensis magnifica / Ribes spp. p54

white fir - Shasta red fir / baldhip rose ABCO-ABMAS/ROGY
Abies concolor - A. shastensis magnifica / Rosa gymnocarpa p55

white fir - Shasta red fir / creeping snowberry ABCO-ABMAS/SYMO
Abies concolor - A. shastensis magnifica / Symphoricarpos mollis p56

white fir - Sadler oak / western prince's-pine ABCO-QUSA/CHUM
Abies concolor - Quercus sadleriana / Chimaphila umbellata p57

white fir - Sadler oak / dwarf Oregongrape - Oregon boxwood ABCO-QUSA/BENE-PAMY
Abies concolor - Quercus sadleriana / Berberis nervosa - Pachistima myrsinites p58

white fir - Sadler oak / dwarf Oregongrape ABCO-QUSA/BENE
Abies concolor - Quercus sadleriana / Berberis nervosa p59

white fir - Sadler oak / golden chinquapin ABCO-QUSA/CACH
Abies concolor - Quercus sadleriana / Castanopsis chrysophylla p60

white fir - Alaska-cedar ABCO-CHNO
Abies concolor - Chamaecyparis nootkatensis p61

white fir - Brewer spruce / thin-leaved huckleberry ABCO-PIBR/VAME
Abies concolor - Picea breweriana / Vaccinium membranaceum p62

white fir - Brewer spruce / slender salal ABCO-PIBR/GAOV
Abies concolor - Picea breweriana / Gaultheria ovatifolia p63

white fir - ponderosa pine | ABCO-PIPO
Abies concolor - _Pinus ponderosa_ | p76

white fir / creeping snowberry | ABCO/SYMO
Abies concolor / _Symphoricarpos mollis_ | p77

Key to the White Fir Associations

1a Alaska-cedar present . . . . ABCO-CHNO (p61)

1b Alaska-cedar absent 2

  2a Brewer spruce present in understory 3

    3a Slender salal present . . . . ABCO-PIBR/GAOV (p63)

    3b Slender salal absent 4

      4a thin-leaved huckleberry present . . . ABCO-PIBR/VAME (p62)

      4b thin-leaved huckleberry absent 5

        5a Port-Orford-ceder absent . . . . ABCO-PIBR/CHUM (p64)

        5b Port-Orford-cedar present 16

  2b Brewer spruce absent in understory 6

    6a Shasta red fir and/or Sadler oak present 7

      7a Shasta red fir usually present in the overstory and understory; sugar pine and golden chinquapin absent 8

        8a Vanillaleaf present, violet usually present 9

          9a Baneberry present, _Ribes_ cover high . . . . ABCO-ABMAS/RIBES (p54)

          9b Baneberry rarely present, _Ribes_ less than 3% cover 10

            10a Rocky Mountain maple rare, violet present, Sadler oak less than 5% cover when present, vanillaleaf usually less than 10% cover . . . . . . ABCO-ABMAS/ROGY (p55)

            10b Rocky Mountain maple usually present, violet rare, Sadler oak usually greater than 10% cover, vanillaleaf usually greater than 10% cover . . . . ABCO-QUSA/CHUM (p57)

        8b Vanillaleaf and violet absent . . . . ABCO-ABMAS/SYMO (p56)

7b Shasta red fir usually absent in the overstory and/or understory; sugar pine, golden chinquapin, dwarf Oregongrape, and Sadler oak usually present 11

11a At least two of the following species present: white inside-out-flower, western twinflower, and Oregon boxwood herb cover usually greater than 25% . . . . ABCO-QUSA/BENE-PAMY (p58)

11b Not with above combination of species; herb cover usually less than 20% 12

12a Golden chinquapin usually present; sugar pine often present in both overstory and understory . . ABCO-QUSA-CACH (p60)

12b Golden chinquapin absent; sugar pine, if present, usually not in both overstory and understory . . . . ABCO-QUSA/BENE (p73)

6b Shasta red fir in understory and Sadler oak absent . . 13

13a Ponderosa pine present in both overstory and understory, canyon live oak absent . . . . ABCO-PIPO (p76)

13b Ponderosa pine absent, or not as above 14

14a Port-Orford-cedar present in understory; tanoak and canyon live oak not both present 15

15a Herb cover greater than 30% (25%) . . . . ABCO-CHLA (p67)

15b Herb cover less than 20% (25%) . . . . . ABCO-CHLA/Depauperate (p72)

14b Port-Orford-cedar absent in understory; or if present, then tanoak and canyon live oak both present . . . 16

16a Tanoak present or canyon live oak cover greater than 40% . . . ABCO-LIDE3 (p65)

16b Tanoak absent 17

17a Pacific yew cover greater than 5%; creeping snowberry absent to less than 10% cover . . . . ABCO-TABR (p66)

17b Pacific yew absent to less than 5% cover; if greater than 5%, then creeping snowberry cover greater than 10% 18

18a Rocky Mountain maple and baneberry present, whipplevine absent . . . . ABCO-ACGL (p70)

18b Rocky Mountain maple and/or baneberry absent 19

19a Sugar pine present in either overstory or understory, dwarf Oregongrape and trailing blackberry present . . . . ABCO-PSME (p68)

19b Sugar pine absent, or if present, either dwarf Oregongrape or trailing blackberry absent 20

20a Herb cover greater than 60%; trailing blackberry absent, baneberry often present, Ribes sometimes present (in particular R. binominatum) . . . . ABCO/Herb (p71)

20b Herb cover less than 60%, if greater than 60%, then trailing blackberry present, vanillaleaf cover greater than 50%, and Ribes rarely present 21

21a Dwarf Oregongrape, vanillaleaf, trailing blackberry, Oregon fairy-bell, and creambush oceanspray present in combinations of at least three, usually four, of the species with covers greater than 5% . . . . . ABCO/BENE (p59)

21b Above species absent or present in combinations of two or less; if present, the cover values will be low (usually 1 - 5%) 22

22a Creambush oceanspray present; creeping snowberry and western starflower present . . . . ABCO-PSME/HODI (p75)

22b Creambush oceanspray absent, if present then creeping snowberry and western starflower absent 23

23a Dwarf Oregongrape present, white fir cover in understory greater than 20% . . . ABCO-PSME/BENE (p73)

23b Dwarf Oregongrape absent, if present then white fir cover in understory less than 20% 24

24a White fir cover in understory greater than 20% and Douglas-fir present in understory . . ABCO-PSME/Depauperate (p74)

24b White fir cover in understory less than 20%, if greater than 20% then Douglas-fir absent in understory . . ABCO-SYMO (p77)

WHITE FIR SERIES SUMMARY
ABCO N = 311

EXTENT: Ubiquitous, very little west of coastal crest.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4571	646	2060-6110
Aspect (deg)	3	51	All Aspects
Slope (%)	39	18	0-94
Soil Depth (in)	38	15	8-110
Total BA (ft^2)	341	141	0-800

GENERAL DESCRIPTION

Litter is 89% ± 16.
Moss is 9% ± 24.
Bareground is 3% ± 9.
Rock is 7% ± 13.

VEGETATION: (See pages 78-106 for complete tables)

Tree Overstory	AVG % COVER	% CONS	REMARKS
Shasta red fir (ABMAS)	13	21	Cooler associations
white fir (ABCO)	34	83	Climax dominant
incense-cedar (CADE3)	8	17	Versatile seral species
sugar pine (PILA)	6	32	Fast growth on warm wet sites
ponderosa pine (PIPO)	10	18	Driest associations
Douglas-fir (PSME)	40	87	All associations

Tree Understory	AVG % COVER	% CONS	REMARKS
white fir (ABCO)	29	100	Climax dominant
Shasta red fir (ABMAS)	5	17	Regenerates on coldest sites
incense-cedar (CADE3)	4	25	Regenerates anywhere
sugar pine (PILA)	2	13	Good growth on medium sites
ponderosa pine (PIPO)	2	5	Does well on harsh sites
Douglas-fir (PSME)	7	53	Appropriate in all associations
Sadler oak (QUSA)	16	21	Competitive, physical barrier

Shrub, Herb & Grass

dwarf Oregongrape (BENE)	16	65	Indicates average soil and water regime
western prince's-pine (CHUM)	5	56	Occurs everywhere
baldhip rose (ROGY)	4	77	Occurs everywhere
creeping snowberry (SYMO)	5	66	Usually drier sites
vanillaleaf (ACTR)	16	41	Moist, cool soil surface
threeleaf anemone (ANDE)	2	50	Cool, moist
bigleaf sandwort (ARMA3)	2	36	Unknown
Queen's cup (CLUN)	3	24	Cool, moist
Oregon fairy-bell (DIHOO)	2	44	Cool, moist where cover is high
western rattlesnake-plantain (GOOB)	1	52	Ubiquitous
western twinflower (LIBOL)	17	33	Warm, moist
white vein pyrola (PYPI)	1	36	Cool, moist
starry Solomon-plume (SMST)	4	39	Cool, moist
white trillium (TROV)	1	38	Moist

WHITE FIR - SHASTA RED FIR/CURRANT
ABCO-ABMAS/RIBES N = 7

EXTENT: Illinois Valley, possibly Applegate and Ashland Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4994	550	3800-5460
Aspect (deg)	311	52	245-55
Slope (%)	32	19	0-52
Soil Depth (in)	36	7	26-45
Total BA (ft^2)	349	68	240-440

GENERAL DESCRIPTION

Soils are often developed from granodiorite or glacial till, well covered with litter (91%). Some bareground (1%) and rock (6%). Stands are usually found on mid-slope, often convex positions.

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	59	100	Climax
Shasta red fir (ABMAS)	12	100	Coclimax
Douglas-fir (PSME)	3	43	Seral, marginal growth
incense-cedar (CADE3)	3	14	Seral to minor climax
Tree Understory			
white fir (ABCO)	8	100	Excellent growth
Shasta red fir (ABMAS)	4	100	Excellent growth
Shrub, Herb & Grass			
purple sweet-root (OSPU)	3	100	Indicates coldest ABCO sites
currant (RIBES)	18	100	Wet, cool indicators
baneberry (ACRU)	20	100	Wet, cold indicator
Alaska oniongrass (MESU)	3	86	Tolerates cold and shade

DISCUSSION: Douglas-fir growth is marginal on most sites where mountain hemlock (*Tsuga mertensiana*) is present because of low soil and air temperatures. On the warmer sites (south facing, shallow soils) it may produce wood as well as white fir. Incense-cedar (*Calocedrus decurrens*) is appropriate for the more basic soil types and where root rots are a problem. Naturals and advance reproduction can be a significant aid to regeneration efforts. Shrub vegetation can be competitive, particularly where burning releases snowbrush ceanothus (*Ceanothus velutinus*). Watch

for snowbrush ceanothus in adjacent cuts or roadsides as an indication of its competition potential. Sites are moist and have a high constancy of currant (Ribes spp.), consequently blister rust hazard is high. Burning could be extremely damaging if duff is consumed on the erosive, granitic sites. Duff dampens the unusually high surface temperature fluxuations on granitics that are detrimental to regeneration. Alaska oniongrass (Melica subulata) and Idaho fescue (Festuca idahoensis) are native grasses that may help erosion control efforts in areas bared by management activities. Herbage production is excellent.

WHITE FIR - SHASTA RED FIR/BALDHIP ROSE
ABCO-ABMAS/ROGY N = 8

EXTENT: Illinois Valley, Ashland, and possibly Applegate and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	5056	410	4460-5750
Aspect (deg)	38	99	245-133
Slope (%)	32	8	23-40
Soil Depth (in)	40	16	24-70
Total BA (ft^2)	385	123	160-520

GENERAL DESCRIPTION

Soils are generally acid-igneous and deep. Very little bareground and rock (1% and 4%). Litter averages 89%. Topographic position is usually mid-slope concave to convex.

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	29	100	Climax
Shasta red fir (ABMAS)	15	100	Coclimax
Douglas-fir (PSME)	16	88	Seral, fair growth
Tree Understory			
white fir (ABCO)	19	100	Fair growth
Shasta red fir (ABMAS)	8	100	Good growth and survival
Port-Orford-cedar (CHLA)	2	25	Poor growth
Douglas-fir (PSME)	2	38	Temperature limited
Sadler oak (QUSA)	3	50	Can be competitive
mountain hemlock (TSME)	1	13	Occasionally present in cold pockets
Shrub, Herb & Grass			
baldhip rose (ROGY)	7	100	Occurs from 800 to 6800'
dwarf Oregongrape (BENE)	5	50	On warmer, better sites
creeping snowberry (SYMO)	10	88	On warmest sites
purple sweet-root (OSPU)	4	50	Cool, wet indicator
white inside-out-flower (VAHE)	2	75	Cool, wet indicator
stream violet (VIGL)	3	88	Cool, wet indicator

DISCUSSION: White fir and Shasta red fir (*Abies magnifica shastensis*) are appropriate for regenerating this Association. Douglas-fir will perform (survival and growth) slightly better here than in the ABCO-ABMAS/RIBES Association. Snowbrush ceanothus is a potential competition problem and should be watched for. Western white pine (*Pinus monticola*) can be productive if blister rust hazard is low. The granitic soils at this elevation present a management challenge. (See the discussion for the ABMAS/SYMO Association.) Damage during precommercial and commercial entry in Shasta red fir and white fir may cause serious growth loss because of rot. If damage cannot be avoided, it may be necessary to shorten the rotation before the rot significantly affects yield.

WHITE FIR - SHASTA RED FIR/CREEPING SNOWBERRY
ABCO-ABMAS/SYMO N = 18

EXTENT: Ashland, Applegate, and Illinois Valley Districts; and possibily Galice District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	5481	321	5000-6110
Aspect (deg)	345	102	All
Slope (%)	39	15	5-60
Soil Depth (in)	40	24	18-92
Total BA (ft²)	303	119	140-520

GENERAL DESCRIPTION

Occurs on granodiorite, hornblende, and metamorphic materials; on concave to convex topography at mid to upper 1/3 slope positions. Low moss cover (0%) indicates low above-ground moisture. Litter (91%), rock (7%), and bareground (6%).

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	38	100	Climax
Shasta red fir (ABMAS)	18	67	Coclimax
Douglas-fir (PSME)	24	61	Seral
Tree Understory			
white fir (ABCO)	30	100	Excellent growth
Shasta red fir (ABMAS)	4	78	Excellent growth
Douglas-fir (PSME)	3	39	Good growth
Shrub, Herb & Grass			
creeping snowberry (SYMO)	2	72	Common, no indications
three-tooth mitrewort (MITR2)	3	28	Unknown as to indicator value
threeleaf anemone (ANDE)	2	56	Moist sites
western prince's-pine (CHUM)	4	50	Common, no indications
baldhip rose (ROGY)	5	56	Common, no indications

DISCUSSION: Productivity is fair. White fir, Shasta red fir, and Douglas-fir are all appropriate for regeneration. White fir and Shasta red fir are more appropriate in the wetter sites, indicated by coolwort foamflower (*Tiarella trifoliata*). Warmer sites of the Association have white-flowered hawkweed (*Hieracium albiflorum*) and larkspur (*Delphinium* spp.).

WHITE FIR - SADLER OAK/WESTERN PRINCE'S-PINE
ABCO-QUSA/CHUM N = 8

EXTENT: Illinois Valley, Galice, Applegate, and possibly Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4672	303	4240-5200
Aspect (deg)	344	71	All
Slope (%)	40	9	25-54
Soil Depth (in)	46	15	25-72
Total BA (ft^2)	383	202	100-680

GENERAL DESCRIPTION

Ridge to mid-slope positions on granitics and metamorphics. Can be concave or convex. Litter averages 86% cover, moss 14%, bareground 2%, and surface rock 16%.

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	30	88	Climax
Shasta red fir (ABMAS)	4	75	Coclimax on cooler sites
Douglas-fir (PSME)	33	75	Good growth, except cooler sites
Tree Understory			
Rocky Mountain maple (ACGL)	3	63	Cool, wet indicator
sugar pine (PILA)	1	25	Good growth, on warmer sites
Sadler oak (QUSA)	22	88	Climax, planting barrier
white fir (ABCO)	24	100	Excellent growth
Shasta red fir (ABMAS)	4	63	Fair growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	10	75	Usually on deeper soil
western prince's-pine (CHUM)	8	88	Common
thin-leaved huckleberry (VAME)	5	63	Cooler sites
vanillaleaf (ACTR)	20	100	Good top soil
western twinflower (LIBOL)	14	50	Moderate sites
one-sided pyrola (PYSE)	3	88	Occurs on soils 38" avg.

DISCUSSION: This is a very productive association. Soils are deep and loamy and the above-ground moisture availability is high. There are a few sites where high surface rock is a physical barrier to planting, but most often that layer is shallow. In areas with thin-leaved huckleberry (*Vaccinium membranaceum*) and Rocky Mountain maple (*Acer glabrum*), soil temperatures may limit the survival and growth of Douglas-fir. Generally the metamorphic soils are more productive and have less problems than the granitics. If prescribing for granitics see the disscussion for the ABMAS/SYMO Association.

WHITE FIR - SADLER OAK/DWARF OREGONGRAPE - OREGON BOXWOOD
ABCO-QUSA/BENE-PAMY N = 16

EXTENT: Illinois Valley, some on Galice and Applegate, and possibly Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4457	361	4020-5160
Aspect (deg)	4	80	225-110
Slope (%)	47	14	25-67
Soil Depth (in)	36	10	18-50+
Total BA (ft²)	350	110	200-560

GENERAL DESCRIPTION

Commonly on granodiorite and metamorphics; on mid-slopes to ridgetops and mostly convex topography. Litter (97%), moss (4%), and bareground (1%). Rock (12%) is slightly higher than the Series average.

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	34	100	Climax
Douglas-fir (PSME)	38	94	Seral, good growth
Tree Understory			
golden chinquapin (CACH)	4	69	Shallow soils
white fir (ABCO)	21	100	Good growth
Sadler oak (QUSA)	11	100	Climax
Port-Orford-cedar (CHLA)	5	13	Performs well in concavities
Douglas-fir (PSME)	5	56	Good growth
Shrub, Herb & Grass			
baldhip rose (ROGY)	4	100	Common
western prince's-pine (CHUM)	8	88	Common
dwarf Oregongrape (BENE)	22	94	Usually deep soils
Oregon boxwood (PAMY)	3	69	Common
white inside-out-flower (VAHE)	2	88	Wet indicator
all shrubs	51	100	
all herbs	47	100	

DISCUSSION: Timber productivity is moderate. Temperatures (soil and air) are not often limiting. A variety of species could be used for

regeneration including (in order of decreasing appropriateness): white fir, Douglas-fir, Shasta red fir, incense-cedar, sugar pine (*Pinus lambertiana*), western white pine, and Port-Orford-cedar (*Chamaecyparis lawsoniana*). Port-Orford-cedar can be established in the lower slope concavities only. It is sensitive to moisture stress and cold. Control of naturally high shrub and herb competition may increase conifer growth.

WHITE FIR - SADLER OAK/DWARF OREGONGRAPE
ABCO-QUSA/BENE N = 10

EXTENT: Illinois Valley, Galice, Applegate, and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4434	332	3960-5000
Aspect (deg)	136	100	All
Slope (%)	42	17	25-78
Soil Depth (in)	32	14	12-50+
Total BA (ft²)	366	117	160-520

GENERAL DESCRIPTION

Mid-slope to ridgetop positions on a mixture of geologic material. Litter averages 89%, moss 1%, bareground 3%, and surface rock is quite high at 19%.

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Shasta red fir (ABMAS)	8	30	Seral
white fir (ABCO)	44	80	Climax
Douglas-fir (PSME)	44	90	Seral
sugar pine (PILA)	7	40	Seral
Tree Understory			
Douglas-fir (PSME)	4	40	Fair growth
white fir (ABCO)	33	100	Excellent growth
Sadler oak (QUSA)	11	90	Common, can be competitive
tanoak (LIDE3)	2	20	Competitive
Shasta red fir (ABMAS)	10	40	Good growth
Shrub, Herb & Grass			
western prince's-pine (CHUM)	5	90	Occurs on 37% of Siskiyou plots
dwarf Oregongrape (BENE)	9	80	Ubiquitous, usually on deep soils
vanillaleaf (ACTR)	7	50	Common
white vein pyrola (PYPI)	2	70	Avg. elev. is 4134 feet

DISCUSSION: Timber productivity is moderate. Douglas-fir, white fir, incense-cedar, sugar pine, and Shasta red fir will all survive but slow growth should be expected with Douglas-fir and sugar pine. Some sites

may have high surface rock content and relatively shallow soils. Incense-cedar, Douglas-fir, and sugar pine would be most appropriate in these areas. Campgrounds needing "hiding cover" between campsites could use Pacific yew (Taxus brevifolia). It will provide a thick, sound absorbent separation, grows slowly, and is very tolerant of shade. Evidence of fire in this Association is somewhat rare as in the other ABCO-ABMAS and ABCO-QUSA associations.

WHITE FIR - SADLER OAK - GOLDEN CHINQUAPIN
ABCO-QUSA-CACH N = 15

EXTENT: Illinois Valley, Galice, Applegate, Ashland, and possibly Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4552	670	3570-5490
Aspect (deg)	151	96	All
Slope (%)	37	22	7-94
Soil Depth (in)	34	17	14-60
Total BA (ft^2)	288	155	60-600

GENERAL DESCRIPTION

Mostly upper third and lip of ridgetops on convex slopes. All types of geologic material. Litter averages 87%, moss 4%, bareground 1%, and surface rock averages 3% ground cover.

VEGETATION: (See page 78 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Shasta red fir (ABMAS)	7	33	Seral to minor climax
white fir (ABCO)	24	80	Climax
sugar pine (PILA)	13	73	Seral
Douglas-fir (PSME)	35	100	Seral
ponderosa pine (PIPO)	12	27	Seral
Tree Understory			
white fir (ABCO)	32	100	Fair growth on exposed ridges
golden chinquapin (CACH)	13	87	Common, can indicate shallow imbalanced soils
sugar pine (PILA)	5	53	Excellent growth
Douglas-fir (PSME)	12	67	Excellent growth
canyon live oak (QUCH)	2	27	Indicator of shallow soils, hot sites
Sadler oak (QUSA)	17	73	Can be competitive
tanoak (LIDE3)	3	13	Can be competitive
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	14	73	Usually occurs on deep soils
western prince's-pine (CHUM)	6	80	Common
baldhip rose (ROGY)	2	60	Common
all shrubs	38	100	
all herbs	11	100	

DISCUSSION: This is the warmest and driest of the ABCO-QUSA associations. It commonly has golden chinquapin (Castanopsis chrysophylla), sugar pine, and less commonly but on dryer sites, canyon live oak (Quercus chrysolepis). Productivity is moderate to low. As the cover of canyon live oak increases, productivity decreases. The average slope is southerly and moss cover is low. High humidity and fog is less common here than in other ABCO-QUSA associations. Douglas-fir, white fir, incense-cedar, sugar pine, and Shasta red fir are all appropriate for regeneration. Even ponderosa pine (Pinus ponderosa) and Port-Orford-cedar can be used at the environmental moisture extremes.

WHITE FIR - ALASKA-CEDAR
ABCO-CHNO N = 1

EXTENT: High elevation and north slope concavities of Applegate and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	5580	--	--
Aspect (deg)	360	--	--
Slope (%)	35	--	--
Soil Depth (in)	50	--	--
Total BA (ft²)	640	--	--

GENERAL DESCRIPTION

Cirque or cirque-like topography on mixed glacial parent material. With 100% litter in all size classes; no bareground.

VEGETATION: (See page 84 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	80	--	Climax dominant
Alaska-cedar (CHNO	50	--	Minor climax
Tree Understory			
white fir (ABCO)	80	--	Broad environmental range
Shasta red fir (ABMAS)	20	--	Cool, wet indicator
mountain hemlock (TSME)	3	--	Cold air and soil
Alaska-cedar (CHNO)	50	--	Cold, wet indicator
incense-cedar (CADE3)	8	--	Broad environmental range
Brewer spruce (PIBR)	3	--	Cool, low transpiration indicator
Shrub, Herb & Grass			
total herbs	88	--	Wet, herb rich site

DISCUSSION: Although limited in extent, this Association supports a number of sensitive plants. Consult Forest Threatened and Endangered guides when planning activities in the area. A few to watch for are: Oregon bensonia (*Bensoniella oregona*), Oregon bleedingheart (*Dicentra formosa oregana*), broad-scaled owl-clover (*Orthocarpus cuspidatus*), and Applegate gooseberry (*Ribes marshallii*).

WHITE FIR - BREWER SPRUCE/THIN-LEAVED HUCKLEBERRY
ABCO-PIBR/VAME N = 7

EXTENT: Applegate and Illinois Valley Districts, and possibly Galice and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4726	276	4300-5120
Aspect (deg)	25	37	340-68
Slope (%)	48	15	30-70
Soil Depth (in)	30	15	12-50
Total BA (ft^2)	286	94	200-440

GENERAL DESCRIPTION

Cool aspects with 97% litter, 8% rock, and 5% bareground. Fairly high moss cover at 18%. Coolest of the ABCO-PIBR associations and the lowest productivity. Occurs on granitics and mixed metamorphics.

VEGETATION: (See page 84 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	25	100	Climax
Brewer spruce (PIBR)	34	43	Minor climax
Douglas-fir (PSME)	30	71	Seral
Tree Understory			
white fir (ABCO)	25	100	Good growth, good survival
Shasta red fir (ABMAS)	4	71	Good regeneration choice
Brewer spruce (PIBR)	5	100	Fair growth on poorest soil
Sadler oak (QUSA)	25	100	Competition and physical planting barrier
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	8	71	On deeper soils
western prince's-pine (CHUM)	5	86	Ubiquitous
thin-leaved huckleberry (VAME)	3	100	Cold, wet indicator
creambush oceanspray (HODI)	6	43	Shallow or non-fertile soil indicator
Oregon boxwood (PAMY)	3	57	

DISCUSSION: This is the coolest and the least productive of the ABCO-PIBR associations. The granitics are generally low in fertility. On these poor sites Brewer spruce (Picea breweriana) can produce more biomass than Douglas-fir. Shasta red fir may also out-produce Douglas-fir. Soil temperatures are low and the soils warm slowly. Stands are sparse with continuous vertical structure. Their composition and structure is different than adjacent land and provides important wildlife diversity.

WHITE FIR - BREWER SPRUCE/SLENDER SALAL
ABCO-PIBR/GAOV N = 4

EXTENT: West side Illinois Valley, Applegate, and possibly Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4273	434	4010-4920
Aspect (deg)	357	34	340-62
Slope (%)	29	13	16-47
Soil Depth (in)	38	11	24-50
Total BA (ft^2)	345	64	280-400

GENERAL DESCRIPTION

Mostly concave topography on schist and mixed metamorphic. Litter 100%, surface rock 8%, and bareground 3%. Deepest soils of the ABCO-PIBR associations and the most productive.

VEGETATION: (See page 84 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	17	100	Climax
sugar pine (PILA)	11	100	Usually indicates seasonal water surplus, seral
Brewer spruce (PIBR)	17	75	Minor climax
Douglas-fir (PSME)	42	75	Seral
Tree Understory			
white fir (ABCO)	30	100	Broad environmental range
Shasta red fir (ABMAS)	3	75	Cooler soils but not cold
golden chinquapin (CACH)	5	100	Typically on shallow nutrient poor soils
Brewer spruce (PIBR)	9	100	Needs atmospheric moisture high humidity
Shrub, Herb & Grass			
western prince's-pine (CHUM)	8	100	Indicates forest setting
slender salal (GAOV)	8	100	Indicates cool, moist conditions
red huckleberry (VAPA)	9	100	Usually wetter sites

DISCUSSION: This is the wettest of the ABCO-PIBR associations. The warmer of these sites support rhododendron (*Rhododendron macrophyllum*). A variety of species are available for regeneration. Brewer spruce,

Shasta red fir, and white fir regenerate well naturally but would not do as well as Douglas-fir or sugar pine in open (full sunlight) conditions. This Association occurs mostly on metamorphased materials, less often on schist. The schists are the most fertile soils and the granitics the least. The granitics are also highly erosive, especially at high elevation where frosts are common and precipitation is high.

WHITE FIR - BREWER SPRUCE/WESTERN PRINCE'S-PINE
ABCO-PIBR/CHUM N = 9

EXTENT: Illinois Valley, Galice, and Applegate Districts and possibly Gold Beach District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4289	398	3840-5000
Aspect (deg)	259	90	126-316
Slope (%)	42	18	11-70
Soil Depth (in)	28	15	12-50
Total BA (ft²)	316	82	180-400

GENERAL DESCRIPTION

Usually warmer aspects: westerly and southwesterly; on granitics, gabbro, and mixed metamorphics. Litter (91%), low moss cover (2%), and high surface rock (19%). 8% bareground is twice the Siskiyou Province average.

VEGETATION: (See page 84 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	16	67	Climax
Brewer spruce (PIBR)	5	67	Minor climax
sugar pine (PILA)	15	67	Seral
Douglas-fir (PSME)	39	100	Seral
Tree Understory			
white fir (ABCO)	16	100	Good wildlife thermal cover
Shasta red fir (ABMAS)	15	44	On the cooler sites
golden chinquapin (CACH)	14	44	Occasionally indicates shallow and/or infertile soils
Brewer spruce (PIBR)	4	100	Indicates low transpirational demand
Pacific yew (TABR)	6	44	Streams and concavities
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	13	78	Ubiquitous
western prince's-pine (CHUM)	7	100	Broad range

DISCUSSION: This is the most variable of the ABCO-PIBR associations. There is a phase without Shasta red fir where Pacific yew and creeping snowberry (*Symphoricarpos mollis*) occur. It is a warmer phase but not

important enough to separate. We feel management activities will give the same response throughout the Association. _Ribes_ spp. are common in the ABCO-PIBR associations; susceptible western white pine has a high probability of getting blister rust. Fire is not common. The occasional fire has been low intensity and has left most of the regeneration undamaged. Fire can be extremely damaging on the granitic material. This Association, as well as the other ABCO-PIBR associations, provides excellent wildlife habitat and forest diversity.

WHITE FIR - TANOAK
ABCO-LIDE3 N = 25

EXTENT: Mostly Illinois Valley and Galice Districts. Less often on Applegate and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3764	514	2360-4460
Aspect (deg)	265	153	All
Slope (%)	35	17	1-70
Soil Depth (in)	36	15	15-65
Total BA (ft^2)	353	157	120-780

GENERAL DESCRIPTION

Mostly on metasediments but can occur on all types of material. On concave to convex positions mainly on upper 1/3 of slope to ridgetop. Litter (90%) and bareground (2%); moss (17%) and rock (12%) are high. Above ground moisture is high.

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	26	48	Climax dominant
sugar pine (PILA)	7	64	Seral
Douglas-fir (PSME)	56	100	Seral
Tree Understory			
white fir (ABCO)	23	100	Good growth and survival
golden chinquapin (CACH)	9	56	On drier sites and ridgetops
Port-Orford-cedar (CHLA)	8	24	Wetter sites and concavities
tanoak (LIDE3)	11	88	Competition for moisture
canyon live oak (QUCH)	16	76	Shallow and/or coarse soils
Douglas-fir (PSME)	6	64	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	11	72	Higher cover on better sites
western prince's-pine (CHUM)	5	76	Ubiquitous
baldhip rose (ROGY)	3	80	Ubiquitous
creeping snowberry (SYMO)	3	56	Higher cover on drier sites
red huckleberry (VAPA)	7	32	Usually wetter ABCO sites
sword-fern (POMU)	2	44	Wettest sites of the Association
western twinflower (LIBOL)	15	32	Warm, moist indications
white vein pyrola (PYPI)	1	56	Typical in ABCO associations

DISCUSSION: Timber productivity is generally good with a variety of species to choose from. In order of decreasing performance, Douglas-fir, sugar pine, white fir, and incense-cedar are all appropriate on these sites. In addition, Port-Orford-cedar can be used where red huckleberry (*Vaccinium parviflorum*) is present. *Phytophthora* root rot is a concern when using Port-Orford-cedar, as is blister rust with sugar pine. Natural regeneration can be significant on moist sites. Moisture is generally available and probably surplus in the spring as indicated by the sugar pine and Port-Orford-cedar, which both require excess moisture some time during the growing season. Late summer stress usually develops however, so Port-Orford-cedar should be used only on the wettest sites. Reforestation will be difficult in areas with canyon live oak, particularly when it occurs with more than 20 percent cover; it is an indicator of disturbance and/or high surface rock cover. The depth of the surface rock is the major physical limitation. Soils are generally deep below that layer. Tanoak (*Lithocarpus densiflorus*) is a competition problem on most sites. Effective control can be affected with early recognition and treatment.

WHITE FIR - PACIFIC YEW
ABCO-TABR N = 16

EXTENT: Mostly Applegate District; also Galice, Illinois Valley, Ashland Districts, and possibly the coastal crest.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3704	768	2060-4600
Aspect (deg)	3	80	All
Slope (%)	33	26	0-78
Soil Depth (in)	43	12	10-50
Total BA (ft²)	423	136	160-680

GENERAL DESCRIPTION

Parent rock ranges from alluvial to serpentine. Topography is mostly convex; usually on mid-slope to upper 1/3 positions. Litter and rock average 95% and 5%. Bareground low at 1%. Extremely high cover of moss (59%) indicates high atmospheric moisture.

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	27	88	Climax dominant
Douglas-fir (PSME)	52	100	Seral
Tree Understory			
golden chinquapin (CACH)	4	56	Shallow or rocky soils
Douglas-fir (PSME)	8	50	Good growth and survival
canyon live oak (QUCH)	2	44	Shallow and/or rocky soils
Pacific yew (TABR)	19	88	Humid, warm concavities
white fir (ABCO)	30	100	Good growth and survival
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	27	100	High cover on good sites
western prince's-pine (CHUM)	3	69	Ubiquitous
Oregon boxwood (PAMY)	2	56	No preferred aspect
baldhip rose (ROGY)	3	100	Ubiquitous
creeping snowberry (SYMO)	7	81	Usually on drier sites
vanillaleaf (ACTR)	35	50	Moist site indicator
Queen's cup (CLUN)	2	75	Moist site indicator
western twinflower (LIBOL)	55	100	Moist site indicator

DISCUSSION: Timber productivity is good. The temperature regime is moderate, seldom extreme. There is usually ample ground and atmospheric water (moss cover is 59%); however, there may sometimes be an accumulation of colluvial rock in the concavities. Regeneration can be accomplished with Douglas-fir, white fir, and sugar pine. Mixtures according to microsite are best and total productivity can be enhanced by mixing tolerant with intolerant species. Shrubs and tanoak may provide significant competition. Early vegetation management treaments will pay dividends in growth. This Association is often rich in flora and fauna. Fuel accumulation rates are high and historically this Association has burned less than most other white fir associations. Because of the lower fire periodicity and fuel accumulations on a moist substrate, rodents are plentiful. The rodents attract raptors and there are usually plenty of old, large trees that provide habitat for other birds.

WHITE FIR - PORT-ORFORD-CEDAR
ABCO-CHLA N = 8

EXTENT: Almost exclusively Illinois Valley District; possibly Galice and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4331	266	4100-4860
Aspect (deg)	317	54	All
Slope (%)	27	19	5-50
Soil Depth (in)	38	9	29-56
Total BA (ft^2)	430	106	320-600

GENERAL DESCRIPTION

Occurs on acid-igneous to mixed metamorphic parent materials; on concave to convex mid-slope positions (occasionally on upper 1/3 and ridgetops). Litter (92%), moss (6%), rock (4%), and bareground less than (1%).

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	12	63	Climax dominant
Douglas-fir (PSME)	60	100	Seral
Tree Understory			
white fir (ABCO)	16	100	Good growth and survival
Port-Orford-cedar (CHLA)	4	88	Good upland management possibilities
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	11	100	Common in series
western prince's-pine (CHUM)	5	88	Ubiquitous
baldhip rose (ROGY)	7	100	Ubiquitous
vanillaleaf (ACTR)	23	100	Cool, moist
trail-plant (ADBI)	3	100	Warm, moist
threeleaf anemone (ANDE)	2	88	Warm, moist
western twinflower (LIBOL)	6	75	Warm, moist

DISCUSSION: The granitic soils limit timber productivity. Granitics are infertile, porous with low water holding capacity, and are usually

very erosive. This combination of characteristics lessens nutrient accumulation and slows vegetation production. Nevertheless, some sites like Cave Creek, are fairly productive because of the high humidity, protected position, and common occurrence of fog. In order of decreasing performance, Douglas-fir, white fir, Port-Orford-cedar, and incense-cedar are all appropriate for regeneration. Frost may be an occassional problem obstructing regeneration establishment.

WHITE FIR - DOULGAS-FIR
ABCO-PSME N = 19

EXTENT: Ashland, Applegate, Illinois Valley, and possibly Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	4133	460	2580-4910	All parent rocks; convex, rarely concave positions on mid-slopes to upper 1/3 where QUCH is usually present. Litter cover is 91%, moss is high at 26%, bareground and rock average 2% and 3% respectively.
Aspect (deg)	334	75	All	
Slope (%)	45	21	10-78	
Soil Depth (in)	40	14	10-60	
Total BA (ft^2)	408	127	160-680	

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	33	74	Climax dominant
sugar pine (PILA)	5	79	Seral
Douglas-fir (PSME)	46	100	Seral
Tree Understory			
white fir (ABCO)	37	100	Good growth, survival fair
golden chinquapin (CACH)	21	74	Shallow soils
sugar pine (PILA)	1	37	Good association for PILA
Douglas-fir (PSME)	5	74	Good growth and survial
canyon live oak (QUCH)	3	37	On hotter sites
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	32	100	High cover on better sites
Pacific dogwood (CONU)	18	37	Associated with ACMA and QUCH
California hazel (COCOC)	6	53	Associated with ACMA and QUCH
whipplevine (WHMO)	15	63	Hot but moist sites
vanillaleaf (ACTR)	30	58	Cool, moist sites
Oregon fairy-bell (DIHOO)	3	68	Cool to warm, moist sites

DISCUSSION: Sugar pine seems to have the ability to store water in its bole for use in times of shortage; similar to that of a cactus. It can survive and grow well on dry sites as long as there is surplus water

available at some time during the growing season. Thus, it is not necessarily drought tolerant but rather "avoids" sites that are dry throughout the season. It is less drought tolerant than Douglas-fir or ponderosa pine, but is capable of excellent diameter growth on medium sites where its stored water is an advantage compared to other stressed conifers. This Association is one of the best sugar pine producers but is also appropriate for Douglas-fir and white fir. California hazel (Corylus cornuta californica) and creambush oceanspray (Holodiscus discolor) may be competitve on some sites and require control. Both species indicate the relative dryness of the site. As creambush oceanspray becomes more dense, the site is more likely to have moisture limitations.

WHITE FIR/DWARF OREGONGRAPE
ABCO/BENE N = 25

EXTENT: Mostly Illinois Valley and Applegate, some Galice and Ashland Districts and possibly Gold Beach District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4297	434	3080-4960
Aspect (deg)	8	82	All
Slope (%)	47	16	0-78
Soil Depth (in)	36	11	10-50
Total BA (ft^2)	388	114	150-680

GENERAL DESCRIPTION

All parent rock types. Mostly mid-slope and convex occurrences. Litter (95%), moss (5%), bareground (2%), and rock (5%) are all within Series norms.

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	36	88	Climax dominant
Douglas-fir (PSME)	50	96	Seral
Tree Understory			
white fir (ABCO)	27	100	Excellent growth and yield
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	23	92	Moister sites than SYMO
creambush oceanspray (HODI)	8	56	High cover is dry site indicator
baldhip rose (ROGY)	5	92	Ubiquitous
creeping snowberry (SYMO)	4	88	Drier sites than BENE
vanillaleaf (ACTR)	24	76	Cover is quite high
trail-plant (ADBI)	5	72	Common in Series
threeleaf anemone (ANDE)	3	56	Cool sites
Oregon fairy-bell (DIHOO)	3	80	Cool sites

DISCUSSION: The White Fir/Dwarf Oregongrape Association is one of the most commonly occurring associations in southwestern Oregon. There is minor variation within the Association. It is floristically rich and productive. Stocking densities and growth rates are often greater than predicted in normal yield tables. Stocking level control to maximize

growth and salvage mortality is essential. The number and amount of cover of shrub species contribute to its richness but also create the need for vegetation management measures. This Association is characterized by warm, moist, mid-mesic environments and management problems are few. White fir diameter growth is excellent and the use of white fir in the stand whether from naturals, advanced reproduction, or planting concurrently with Douglas-fir will greatly enhance production. White fir, however, is often in conflict with intensive practices because of its susceptibility to rot if damaged. It is possible that heavy thinnings early in the rotation may maximize usable fiber production rather than several light entries, if tree damage is to be avoided.

WHITE FIR - ROCKY MOUNTAIN MAPLE
ABCO-ACGL N = 15

EXTENT: Mostly Ashland, also Applegate and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4953	480	4190-5600
Aspect (deg)	345	50	All
Slope (%)	49	20	10-85
Soil Depth (in)	43	15	24-72
Total BA (ft^2)	233	68	120-400

GENERAL DESCRIPTION

Granodiorite and metamorphic materials. Commonly upper 1/3, less often mid-slopes, on usually convex topography. Litter is relatively low at 84% and moss cover is high at 17%. Bareground and rock are 3% and 7% respectively.

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	46	93	Climax dominant
Douglas-fir (PSME)	22	67	Seral
sugar pine (PILA)	6	33	Seral
Tree Understory			
white fir (ABCO)	30	100	Subject to rot
Rocky Mountain maple (ACGL)	5	100	Average elevation is 4667 feet
Douglas-fir (PSME)	3	40	Possibly too cool for maximum PSME production
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	19	73	Good (productive) sites
creambush oceanspray (HODI)	4	53	Dry sites
baldhip rose (ROGY)	7	93	Ubiquitous
baneberry (ACRU)	6	87	Cold sites
threeleaf anemone (ANDE)	5	80	Cool sites
cleavers bedstraw (GAAP)	8	87	No indications
three-tooth mitrewort (MITR2)	5	60	No indications
starry Solomon-plume (SMST)	6	87	Cool sites
white trillium (TROV)	3	73	High cover on moist sites

DISCUSSION: This Association is dry, but cool and supports a corresponding array of species. Baneberry (Actaea rubra) and Rocky Mountain maple indicate the cool environment of the Association, and creambush oceanspray represents its drier nature. Timber production and forage production are both good; transitory range development has potential. Many sites are on acid-igneous rocks (e.g., granitics) and have the associated problems of erosiveness, moisture retention, and temperature extremes. The better sites are on metavolcanic materials, e.g., they are less erosive, wetter, and have moderate soil surface temperatures.

WHITE FIR/Herb
ABCO/Herb N = 17

EXTENT: Mostly on Applegate District, also on Illinois Valley and Ashland Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4972	296	4400-5500
Aspect (deg)	346	88	All
Slope (%)	32	19	0-68
Soil Depth (in)	39	11	18-50
Total BA (ft²)	420	214	0-800

GENERAL DESCRIPTION

All types of parent rock including schist and serpentine. Mostly mid-slope occurrences with some on ridgetops; mostly convex positions. Litter cover is 87%, moss 6%, and bareground 4%. The lack of surface rock provides good herb environment.

VEGETATION: (See page 91 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	47	88	Climax dominant
incense-cedar (CADE3)	9	41	Seral
Douglas-fir (PSME)	27	76	Seral
Tree Understory			
white fir (ABCO)	32	100	Productive
Douglas-fir (PSME)	10	41	Good production
incense-cedar (CADE3)	6	41	Fair growth, resistant to root rot
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	15	59	High cover on productive sites
Siskiyou gooseberry (RIBI)	4	41	No indications
trail-plant (ADBI)	6	88	Common
threeleaf anemone (ANDE)	6	71	Cool sites
Oregon fairy-bell (DIHOO)	3	65	Cool sites

DISCUSSION: Forage and timber productivity are high. One Applegate District plot has 800 ft² of basal area. Natural regeneration can be significant; Douglas-fir, white fir, and incense-cedar are all good

performers. Because of the high incidence of Siskiyou gooseberry (Ribes binominatum), planting sugar pine is risky. The gooseberry strongly associates with California brome (Bromus carinatus) and mountain sweet-root (Osmorhiza chilensis) in older stands. Generally the soils are deep, even those on the imbalanced serpentine parent materials are relatively deep; but the best sites are on schist. California brome and leafy peavine (Lathyrus polyphyllus) are good erosion controllers on units and cutbanks. Leafy peavine has the added benefit of nitrogen fixation.

WHITE FIR - PORT-ORFORD-CEDAR/Depauperate
ABCO-CHLA/Depauperate N = 7

EXTENT: Illinois Valley and some Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4587	103	4440-4720
Aspect (deg)	91	83	All
Slope (%)	30	14	20-50
Soil Depth (in)	37	11	15-50
Total BA (ft²)	371	133	200-600

GENERAL DESCRIPTION

Occurs mostly on granodiorite; all topography forms, and mid-slope to ridgetop positions. Litter is 97%, moss is 6%, no bareground on the average, but slightly high surface rock.

VEGETATION: (See page 99 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	16	43	Climax dominant
Douglas-fir (PSME)	46	100	Seral
Tree Understory			
white fir (ABCO)	29	100	Fair production
Port-Orford-cedar (CHLA)	6	100	Good site for CHLA
Douglas-fir (PSME)	1	71	Good production
incense-cedar (CADE3)	3	71	Fair growth and yield
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	9	86	Common
western prince's-pine (CHUM)	4	100	Common
baldhip rose (ROGY)	2	100	Common

DISCUSSION: Timber productivity is good; forage productivity is low, although forage could be produced with a light tree canopy. In order of decreasing performance, Douglas-fir, white fir, Port-Orford-cedar, incense-cedar, sugar pine, and western white pine are all appropriate for regeneration. A mixture would best utilize the site. If Phytophthera or blister rust is detected, consider Port-Orford-cedar or select western white and/or sugar pine for resistant stock sources. The granitic sites

are erosive, sometimes dry and cold, and infertile. The shallowest soils are indicated by pinemat manzanita (*Arctostaphyllos nevadensis*). Burning where pinemat manzanita is present will usually damage the soil surface layers and reduce productivity. The duff layer is very shallow.

WHITE FIR - DOUGLAS-FIR/DWARF OREGONGRAPE
ABCO-PSME/BENE N = 14

EXTENT: Mostly on Applegate, Illinois Valley, and Ashland Districts, some on and Gold Beach District and possibly Galice District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4439	460	3400-5100
Aspect (deg)	346	83	All
Slope (%)	37	15	8-60
Soil Depth (in)	37	15	8-72
Total BA (ft²)	289	92	72-400

GENERAL DESCRIPTION

All parent material types; mostly convex topography from mid-slope to ridgetop. Low litter coverage at 82%, moss is 4%, bareground 6%, and rock 7%.

VEGETATION: (See page 99 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	36	100	Climax dominant
Douglas-fir (PSME)	33	93	Good growth on shallow soils
Tree Understory			
white fir (ABCO)	39	100	Fair growth
Douglas-fir (PSME)	8	86	Good growth
golden chinquapin (CACH)	5	43	On shallow soils
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	9	93	High cover on better sites
baldhip rose (ROGY)	3	93	Ubiquitous
creeping snowberry (SYMO)	4	86	High cover on warmer sites
Oregon fairy-bell (DIHOO)	1	57	Low cover on warmer site
threeleaf anemone (ANDE)	1	43	Very little cover gives no indications

DISCUSSION: This Association was split from the White Fir/Dwarf Oregongrape Association because it is drier, less productive, and Douglas-fir is by far the most appropriate species for regeneration. White fir is less productive here because of higher moisture stress. Incense-cedar will perform well and may be appropriate for sites where root rot is present. Sugar pine is also a possibility if it is rust resistant.

This is a widely occurring association with a lot of variation. The amount of Douglas-fir regeneration in the understory is an important characteristic of this Association.

WHITE FIR - DOUGLAS-FIR/Depauperate
ABCO-PSME/Depauperate N = 9

EXTENT: Mostly Ashland District, some Illinois Valley, possibly Applegate and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4820	329	4360-5310
Aspect (deg)	181	93	All
Slope (%)	36	16	15-67
Soil Depth (in)	32	17	18-60
Total BA (ft^2)	302	76	160-400

GENERAL DESCRIPTION

Occurs mostly on granodiorite and some metamorphics. Mostly convex mid-slopes. Low litter (84%) and moss (1%). Bareground is 2% and surface rock 3%.

VEGETATION: (See page 99 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	11	78	Climax dominant
ponderosa pine (PIPO)	14	67	Seral on dry sites
Douglas-fir (PSME)	20	89	Seral
sugar pine (PILA)	10	33	On sites with good ground water
Tree Understory			
white fir (ABCO)	52	100	Fair productivity
Douglas-fir (PSME)	19	100	Fair productivity
Shrub, Herb & Grass			
all shrubs	6	100	
all herbs	18	100	

DISCUSSION: This is a relatively dry association. Because it is often on granodiorite the soil surface is hot and dry, particularly on southern aspects. Regeneration will be difficult. Minimizing radiation loads and maximizing the protection of the soil surface is important for regeneration success. Douglas-fir, ponderosa pine, sugar pine, and white fir are all appropriate for regeneration. Establishing white fir will be difficult however, and growth will be slow on most sites. Moisture is the most limiting environmental factor. Shrub cover is not heavy under uncut stands but will provide competition after cutting. Herbage production will be low under stands and in clearcuts.

WHITE FIR - DOUGLAS-FIR/CREAMBUSH OCEANSPRAY
ABCO-PSME/HODI N = 17

EXTENT: Mostly Ashland District, some on Illinois Valley, Applegate, and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4708	443	3960-5780
Aspect (deg)	309	96	All
Slope (%)	41	16	9-61
Soil Depth (in)	36	18	12-72
Total BA (ft^2)	284	81	180-520

GENERAL DESCRIPTION

All types of parent rock and topography forms mostly on mid-slopes and upper 1/3. Litter is 90%, moss is low at 1%, and bare-ground and rock are 2% and 3% respectively.

VEGETATION: (See page 99 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	27	88	Climax dominant
ponderosa pine (PIPO)	9	59	Indication of dryness
Douglas-fir (PSME)	41	88	Seral
sugar pine (PILA)	5	29	Less drought tolerant than Douglas-fir
Tree Understory			
white fir (ABCO)	55	100	Fair growth
Douglas-fir (PSME)	9	94	Fair growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	6	65	On better sites
creambush oceanspray (HODI)	3	94	Drier sites
baldhip rose (ROGY)	4	76	Ubiquitous
creeping snowberry (SYMO)	4	94	On dryer sites
baneberry (ACRU)	1	47	Cold sites, high elevation

DISCUSSION: This Association is hot and dry. Dwarf Oregongrape (*Berberis nervosa*) indicates the better sites and tall Oregongrape (*B. repens*) indicates the worst sites. Tall Oregongrape usually occurs on shallow, coarse-textured soils with high coarse fragment content. Regeneration will be difficult; Douglas-fir, ponderosa pine, incense-cedar, sugar pine, and white fir are all appropriate and listed in order of decreasing

performance. Burning on these hot, dry sites could break down soil structure, decrease cation exchange capacity, and increase regeneration difficulties and vegetation management problems. *Ceanothus* spp. are capable of totally occupying these sites, particularly after burning. Western starflower (*Trientalis latifolia*), woodland tarweed (*Madia madioides*), and leafy peavine could all enhance standard dry site mixtures for erosion control.

WHITE FIR - PONDEROSA PINE
ABCO-PIPO N = 9

EXTENT: Mostly Ashland, also Applegate, and Illinois Valley Districts and possibly Galice District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4628	341	4260-5300
Aspect (deg)	4	132	All
Slope (%)	43	17	10-70
Soil Depth (in)	41	13	18-60
Total BA (ft²)	247	120	120-480

GENERAL DESCRIPTION

Mostly acid-igneous rock, but also on schists and serpentine. Mostly mid-slopes and convex topography. Litter is low (84%) and moss is usually absent, an indication of a hot environment. Bareground (7%) and rock (3%).

VEGETATION: (See page 99 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	26	78	Climax dominant
ponderosa pine (PIPO)	16	89	Seral to minor climax
Douglas-fir (PSME)	27	89	Seral to minor climax
Tree Understory			
white fir (ABCO)	52	100	Hot and dry for ABCO
ponderosa pine (PIPO)	2	100	Good to excellent growth
Douglas-fir (PSME)	15	67	Good growth
Shrub, Herb & Grass			
creambush oceanspray (HODI)	6	100	On hotter associations
baldhip rose (ROGY)	3	100	Ubiquitous
creeping snowberry (SYMO)	11	100	More frequent on drier sites

DISCUSSION: This is the hottest, driest association of the White Fir Series. Timber productivity is fair and forage productivity is low. Moisture is the most limiting factor, particularly on the granitic (acid-igneous) parent materials. Douglas-fir, ponderosa pine, and incense-cedar are all appropriate for regeneration. Shrub control may be necessary to help establish regeneration. Soil surfaces should be treated lightly. Regeneration efforts can be enhanced by maintaining surface litter and minimizing solar radiation. Animal control may be necessary on southerly aspects.

WHITE FIR/CREEPING SNOWBERRY
ABCO/SYMO   N = 32

EXTENT: Ashland, Applegate, and Illinois Valley Districts; possibly Galice District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4899	519	3700-6000
Aspect (deg)	140	87	All
Slope (%)	42	18	12-80
Soil Depth (in)	38	19	12-110
Total BA (ft^2)	334	150	40-680

GENERAL DESCRIPTION

All types of geology and topography. Litter is 89% and moss is low at 2%. Bareground is 3% and rock 9%.

VEGETATION: (See page 99 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	41	84	Climax dominant
ponderosa pine (PIPO)	6	31	Seral
Douglas-fir (PSME)	44	78	Seral
Tree Understory			
white fir (ABCO)	10	100	Fair growth
Douglas-fir (PSME)	1	31	Good growth
Shrub, Herb & Grass			
little prince's-pine (CHME)	2	56	Ubiquitous
baldhip rose (ROGY)	2	47	Ubiquitous
creeping snowberry (SYMO)	5	59	High cover on drier sites
all shrubs	10	100	
all herbs	15	100	

DISCUSSION: A widespread and variable association, the White Fir/Creeping Snowberry Association, rates good in timber productivity and fair to poor for herbage. Regeneration is not as difficult as in the hotter white fir associations but there may be problems on some sites. Douglas-fir, ponderosa pine, sugar pine, incense-cedar, and white fir are all appropriate for regeneration. *Ceanothus* spp. may be competitive on hotly burned sites. High basal areas can be carried and stocking level control can significantly boost yields.

TABLE 6: CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-ABMAS/RIBES		ABCO-ABMAS/ROGY		ABCO-ABMAS/SYMO		ABCO-QUSA/CHUM		ABCO-QUSA/BENE-PAMY		ABCO-QUSA/BENE		ABCO-QUSA-CACH	
Number of Samples	7		8		18		8		16		10		15	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:														
ELEV	100	4994	100	5056	100	5481	100	4673	100	4457	100	4434	100	4552
ASPECT	100	311	100	38	100	345	100	344	100	4	100	136	100	151
SLOPE	100	32	100	32	100	39	100	40	100	47	100	42	100	37
TODPTH	100	36	100	40	100	40	100	46	100	36	100	31	100	34
TOTBA	100	349	100	385	100	303	100	383	100	350	100	366	100	288
TREE OVERSTORY:														
ABCO	100	59	100	29	100	38	88	30	100	34	80	44	80	24
ABMAS	100	12	100	15	67	18	75	4	13	5	30	8	33	7
PSME	43	3	88	16	61	24	75	33	94	38	90	44	100	35
CADE3	14	3	13	20	28	4	13	1	13	12	10	3	7	5
PILA					28	2	13	1	38	3	40	7	73	13
PIMO					6	1	13	1						
PIPO					6	1							27	12
PIBR							13	1						
CHLA									6	50			20	8
TSHE													7	8
TOTALO	100	73	100	61	100	67	100	55	100	77	100	81	100	72
TREE UNDERSTORY:														
QUSA			50	3	28	4	88	22	100	11	90	11	73	17
ABCO	100	8	100	19	100	30	100	24	100	21	100	33	100	32
ABMAS	100	4	100	8	78	4	63	4	6	1	40	10	47	3
PSME	14	20	38	2	39	3	25	12	56	5	40	4	67	12
ACGL	43	3	13	8	11	2	63	3	44	3	10	1		
CACH	14	1	13	1	22	2	25	6	69	4			87	13
CADE3	14	3	13	3	22	2			19	2	10	1	20	6
TSME	14	1	13	1	6	1								
CHLA			25	2					13	5			13	9
PIMO					6	3	13	1						
PREM					17	4					10	1		
QUVA					6	95							13	7
PILA							25	1	13	1	10	1	53	5
QUCH							13	3	6	1	20	2	27	2
ACCI							13	1						

TABLE 6 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-ABMAS/RIBES		ABCO-ABMAS/ROGY		ABCO-ABMAS/SYMO		ABCO-QUSA/CHUM		ABCO-QUSA/BENE-PAMY		ABCO-QUSA/BENE		ABCO-QUSA-CACH	
Number of Samples	7		8		18		8		16		10		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
ACMA									6	1	10	3		
TABR									25	2			7	1
ARME											10	3	20	10
LIDE3											20	2	13	3
QUKE											10	8		
PIPO													7	5
TOTALU	100	17	100	32	100	43	100	53	100	42	100	50	100	75
SHRUBS:														
RIBI	14	3	13	1	6	1								
RUPA	43	1	50	3	22	2			44	2	10	1	7	8
ROGY	86	4	100	7	56	5	88	2	100	4	70	4	60	2
SYMO	86	4	88	10	72	2	25	1	88	3	30	1	53	3
HODI	57	3	38	2	11	2	13	1	31	3	20	1	13	1
CHME	43	1	38	1	33	1	38	1	56	1	80	1	53	1
CHUM	14	1	75	2	50	4	88	8	88	8	90	5	80	6
RULA	29	3	50	1	6	3	38	1	13	2				
AMPA	29	2	13	1	22	1			25	2	30	1	20	1
COCOC	14	3	13	3			13	20	50	4	30	2	13	1
VAME	14	1	25	3			63	5	31	4	10	3		
RIVI	14	3	50	1	11	2			13	1				
RILO	14	20	13	1	11	2					10	1	7	1
LOCO	14	8	13	3	6	1								
RILA	57	3	38	2					6	1				
RIBES	29	44							6	8				
RISA	14	3							6	1				
LONIC	14	1												
BENE			50	5	28	2	75	10	94	22	80	9	73	14
RUUR			50	1	11	1	75	1	63	3	40	2	33	1
PAMY			13	1	11	11	13	3	69	3	20	1	40	5
WIMO			13	3			13	8	38	10	10	1	27	3
RIMA			25	2										
RUBUS			13	3										
VAPA					6	T	13	8	6	3			33	5

TABLE 6 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-ABMAS/RIBES		ABCO-ABMAS/ROGY		ABCO-ABMAS/SYMO		ABCO-QUSA/CHUM		ABCO-QUSA/BENE-PAMY		ABCO-QUSA/BENE		ABCO-QUSA-CACH	
Number of Samples	7		8		18		8		16		10		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):														
SOSI					11	5	13	3	6	3				
SALIX					11	1	13	1	19	1				
ARNE					6	1					10	1	20	12
RHPU					6	1					20	1		
CEVE					22	3							7	5
ARPA					11	1							7	1
RICE					11	11								
RICR					11	2								
RIVE					11	1								
CONU							13	80	25	7	10	1		
BEPU							13	1					7	3
RHMA									6	T			7	60
GAFR									6	T				
VASC											6	3	7	1
BEPI											10	1		
GASH													7	90
LEDA													7	5
GABA													7	3
COST													7	1
TOTALS	100	31	100	28	100	13	100	37	100	51	100	19	100	38
HERBS:														
GERAN	14	T												
ARLU	14	1												
POCA5	14	1												
SEOR2	14	1												
COGR	14	3												
AGUR	29	1												
HYCA	29	5												
CIAL	57	2												
HYOC	14	1	13	1										
LATHY	14	3	13	3										
ERAL	71	2	38	3	11	1								
PHCO3	71	2	13	1	11	1								
MOSI	86	2	50	1	11	1	13	1						
VIOLA	14	1	25	3	11	T	13	3	19	2				

TABLE 6 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-ABMAS/RIBES		ABCO-ABMAS/ROGY		ABCO-ABMAS/SYMO		ABCO-QUSA/CHUM		ABCO-QUSA/BENE-PAMY		ABCO-QUSA/BENE		ABCO-QUSA-CACH	
Number of Samples	7		8		18		8		16		10		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
SMST	100	5	75	3	67	1	13	1	44	2	20	1	13	1
PHAD	100	3	50	4	6	1	13	3	44	2	10	1	7	1
ACTR	86	6	88	8	11	8	100	20	94	19	50	7	27	2
ANDE	86	2	100	4	56	2	63	1	63	2	20	2	27	1
TRLA2	86	2	88	2	39	3	38	1	88	2	40	1	20	1
GAAP	86	1	88	3	44	1	38	1	69	1	20	1	7	1
ADBI	71	2	75	5	22	2	25	2	56	3	30	1	7	1
DIHOO	71	2	63	2	11	1	75	1	81	2	50	1	27	1
HIAL	71	2	75	3	56	2	50	2	56	1	10	1	13	1
CLUN	43	2	50	4	17	2	38	2	56	2	10	1	13	2
GOOB	29	2	75	2	28	1	75	1	94	1	30	1	40	1
PYSE	29	2	75	2	56	1	88	3	81	3	30	1	20	1
PYPI	14	1	50	1	44	11	38	1	75	1	70	2	53	1
CASC2	100	3	75	2	28	2	50	5	38	2	30	1		
VAHE	71	3	75	2	17	1	38	1	88	2	20	1		
FRVEB	43	2	75	2	6	3	13	1	38	1	10	1		
TROV	86	1	50	2	39	1	25	1	44	1			27	1
ARLA	29	6	38	2	33	6	13	3	13	1				
ANLY2	14	3	63	1	11	1	13	3	13	1				
NEHE	14	1	13	1	11	5	13	1						
ARMA3	100	1	75	1	72	3			38	2	10	1	27	1
PTAQ	29	6	13	3	6	1			19	6	10	1	33	3
SMRA	29	1	25	2	11	1			31	1	10	1	7	1
MITR2	86	2	25	1	28	3			13	1			7	1
VIAM	57	2	25	11	22	3			6	3				
PERA	14	T	13	3	17	8			6	1				
ACRU	100	20	13	1	22	13								
ASCA3	71	2	25	6	6	8								
HYFEA	14	T	13	1	6	1								
ASHA	29	2	13	1			13	1	31	1	10	1	7	1
VIGL	86	2	88	3			13	1	13	1				
OIFO	14	1	13	1			13	1					7	1
TITR	14	3	13	3			13	1						
OSPU	100	3	50	4					19	1				
VASI	43	5	13	1										

TABLE 6 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-ABMAS/RIBES		ABCO-ABMAS/ROGY		ABCO-ABMAS/SYMO		ABCO-QUSA/CHUM		ABCO-QUSA/BENE-PAMY		ABCO-QUSA/BENE		ABCO-QUSA-CACH	
Number of Samples	7		8		18		8		16		10		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
ERAS					6	3								
ARTH					6	1								
EPAN					6	1								
EPMI					6	1								
LOMAT					6	1								
MOPE					6	1								
NONE					6	1								
PENE					6	1								
POCA8					6	1								
SIHO					6	1								
VIOR2							13	3	6	3			7	1
HECO							13	1			10	1		
PYDE							13	1					13	2
SAXIF							6	1						
APAN									19	2	30	1		
LIWA									19	1				
LICO3									19	1				
GAOR									13	1				
SASA2											10	1	7	1
EBAU											10	1		
LICA3											10	1		
MOOD													7	1
CAAP2													7	1
GAAM													7	1
TOTALH	100	79	100	61	100	26	100	43	100	47	90	11	100	11
GRASSES:														
AREL			13	T										
POA			13	1										
ELGL			13	1										
FESTU			25	2										
MESU	86	3	25	6										

TABLE 6 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-ABMAS/RIBES		ABCO-ABMAS/ROGY		ABCO-ABMAS/SYMO		ABCO-QUSA/CHUM		ABCO-QUSA/BENE-PAMY		ABCO-QUSA/BENE		ABCO-QUSA-CACH	
Number of Samples	7		8		18		8		16		10		15	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSESS (Cont):														
FESU	14	1	25	3	22	2	13	1	31	4	10	1		
BROMU			25	11	6	T			19	1				
FEOC					6	3			6	1				
BRCA					11	1			6	1				
CAREX					6	1	13	1						
FERU													7	1
TOTALG	100	2	100	5	100	1	100	T	100	2	100	T	100	T

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

TABLE 7: CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:								
ELEV	100	5580	100	4726	100	4273	100	4289
ASPECT	100	360	100	25	100	357	100	259
SLOPE	100	35	100	48	100	29	100	42
TODPTH	100	50	100	30	100	38	100	28
TOTBA	100	640	100	286	100	345	100	316
TREE OVERSTORY:								
CHNO	100	50						
ABCO	100	80	100	25	100	17	67	16
PSME			71	30	75	42	100	39
PIBR			43	34	75	17	67	5
PILA			43	20	100	11	67	15
ABMAS			57	7	75	3	44	7
CHLA			14	3	25	15		
PIMO			43	4			33	4
PIPO			14	3			33	3
CADE3			14	1			11	1
TSME			14	50				
TOTALO	100	130	100	84	100	78	100	67
TREE UNDERSTORY:								
CHNO	100	50						
ACGL	100	3	14	1				
TSME	100	3	14	8	25	1		

TABLE 7 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):								
CADE3	100	8	14	1			33	2
ABCO	100	80	100	25	100	30	100	16
PIBR	100	3	100	5	100	9	100	4
ABMAS	100	20	71	4	75	3	44	15
QUSA			100	25	75	34	67	38
PSME			43	4	25	1	44	6
CACH			29	3	100	5	44	14
PILA			29	2	25	5	56	3
TABR			14	3	25	3	44	6
CHLA			43	2	25	7		
QUVA			29	5			44	19
QUCH			14	1			33	5
PIMO			29	4			22	2
QUKE			14	8			11	3
LIDE3					50	13	33	6
PIPO							11	1
TOTALU	100	167	100	67	100	82	100	78
SHRUBS:								
JUCO4	100	3						
LOCO	100	1						
HODI	100	1	43	6				
RIBI	100	3					11	1
VAPA	100	1	29	5	100	9	56	10

TABLE 7 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):								
CHUM			86	5	100	8	100	7
BENE			71	8	50	13	78	13
ARNE			43	5	25	10	33	44
CHME			29	1	25	3	56	1
VAME			100	3	25	3		
RULA			14	3				
RUUR			14	1				
SALIX			14	1				
VASC			14	1				
ROGY			71	1			33	1
PAMY			57	3			11	3
SYMO			43	1			44	2
AMPA			29	5			22	2
ARPA			14	3			11	3
GAFR			14	1			22	4
WHMO			14	1			22	7
RIVI			14	1			22	2
RISA			14	1			11	1
RUPA			14	1			11	1
SOSI			14	1			11	1
GAOV					100	8		
RHMA					25	80	11	3
COCOC							22	2
GASH							11	15
RHCA							11	2

TABLE 7 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):								
BEPU							11	1
CONU							11	1
GABU							11	1
MEFE							11	1
TOTALS	100	9	100	26	100	55	100	46
HERBS:								
ARCO	100	8						
SYRE	100	8						
GAAP	100	3						
VIOR2	100	3						
AQFO	100	1						
ARSY	100	1						
DELPH	100	1						
OSCH	100	1						
TITR	100	1						
VASI	100	1						
VIGL	100	1						
VAHE	100	8	29	2				
ANDE	100	3	14	1				
CLUN	100	1	14	1				
PENE	100	1	14	3				

TABLE 7 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
ARLA	100	20	43	2				
VECA	100	1	14	1	25	1		
ACTR	100	8	29	3	50	5	11	1
DIHOO	100	1	29	1	50	3	22	1
GOOB	100	1	100	1	75	1	44	2
SMST	100	1	14	8	25	1		
HIAL	100	1	14	1			33	2
POMU	100	1			25	1	11	1
ACRU	100	8					11	1
ADBI	100	1					11	8
CASC2	100	3					11	3
ANLY2			14	T				
ANNE			14	1				
APAN			14	3				
CABU2			14	1				
COMA3			14	1				
CRCR			14	3				
FRVEB			14	1				
HEMI			14	3				
LIWA			29	1				
MITR2			14	1				
PERA			29	11				
PENST			14	1				
SESP			14	3				
VIOLA			14	1				

TABLE 7 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
TROV			29	5	25	1		
XETE			43	7	50	4		
LIBOL			71	8	50	23	22	18
PYPI			57	1	75	2	56	4
PYSE			57	4	50	3	11	3
SASA2			14	1	25	1	22	1
IRCH			29	1			11	1
PYDE			14	1			22	2
SMRA			14	1			11	1
TRLA2			14	1			33	4
PYAS					50	1		
LICO3					25	1		
PTAQ							22	4
GAAM							11	3
ASHA							11	1
COST2							11	1
PTAN							11	1
TOTALH	100	88	100	25	100	22	100	13

TABLE 7 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHNO		ABCO-PIBR/VAME		ABCO-PIBR/GAOV		ABCO-PIBR/CHUM	
Number of Samples	1		7		4		9	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES:								
BRCA			14	1				
CAREX			14	1				
POA			14	1				
TOTALG	100	0	100	T	100	0	100	0

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

TABLE 8: CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:														
ELEV	100	3764	100	3704	100	4331	100	4133	100	4297	100	4953	100	4972
ASPECT	100	265	100	3	100	317	100	334	100	8	100	345	100	346
SLOPE	100	35	100	33	100	27	100	45	100	47	100	49	100	32
TODPTH	100	36	100	43	100	38	100	40	100	36	100	43	94	39
TOTBA	100	353	100	423	100	430	100	408	100	388	100	233	100	420
TREE OVERSTORY:														
ABMAS			6	15	13	1	5	4	4	3	13	12	12	5
ABCO	48	26	88	27	63	12	74	33	88	36	93	46	88	47
PSME	100	56	100	52	100	60	100	46	96	50	67	22	76	27
CADE3	12	7	19	3	38	4	16	2	8	12	20	4	41	9
PILA	64	7	13	3			79	5			33	6	6	1
PIPO	8	13	13	1			16	2	8	2			6	20
CHLA	8	8	6	5	25	11								
PIAT	12	4					5	1						
PIBR			6	2										
PIMO					13	1								
PIJE														
LIDE3														
TOTALO	100	75	100	78	100	72	100	75	100	81	100	62	100	67
TREE UNDERSTORY:														
ALRU	4	10												
ACCI	4	1	19	42	25	26	5	8	8	29				
CADE3	32	7	31	4	25	4	47	5	24	2	13	6	41	6
ABCO	100	23	100	30	100	16	100	37	100	27	100	30	100	32
PSME	64	6	50	8	50	2	74	5	36	3	40	3	41	10
CACH	56	9	56	4	50	2	74	21	20	7	13	2	12	2
ARME	36	8	25	17			42	9	32	8	7	3	6	1
QUCH	76	16	44	2	13	1	37	3	20	6				
TABR	24	2	88	19	13	1	11	1	4	3	13	35		
LIDE3	88	11	13	3	25	2	11	1	4	3				
ACMA	8	5	44	5			37	18	20	13	13	35		
PILA	36	2	13	2			37	1			7	1		
PIPO	4	3	6	1										
CHLA	24	8			88	4								
PIAT	4	3											6	1

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
QUVA	8	15												
QUSA	4	3												
ACGL			13	1			11	5	12	2	100	5		
ALSI			19	10										
QUKE							5	1						
PREM													6	3
PIMO														
PIBR														
TSME														
PIJE														
TOTALU	100	64	100	73	100	29	100	71	100	38	100	46	100	39
SHRUBS:														
LEDA	4	5												
GAOV	4	10												
GAFR	8	1												
RUNI	4	1	6	1	38	2								
PAMY	16	1	56	2	13	1	21	2	8	1	7	1		
AMPA	20	3	38	3	13	1	5	3	32	2	60	1	12	5
SYMO	56	3	81	7	38	4	74	6	88	4	47	19	53	6
CHUM	76	5	69	3	88	5	58	12	56	4	33	1	18	2
ROGY	80	3	100	3	100	7	79	3	92	5	93	7	65	3
CHME	48	1	44	1	88	1	37	1	56	1	7	1	29	1
BENE	72	11	100	27	100	11	100	32	92	23	73	19	59	15
RUUR	36	3	88	3	88	1	89	2	64	3	20	2	12	5
RUPA	8	2	31	4	13	1	26	6	36	3	73	7	35	3
HODI	24	3	44	4	25	3	53	5	56	8	53	4	41	6
COCOC	16	2	44	9	50	3	53	6	52	3	7	3	24	6
WHMO	68	6	38	8	75	5	63	15	44	7			6	3
RILA	4	1	19	1	38	2	5	1	4	1	27	6		
VAPA	32	7	6	3	38	1	16	1						
CONU	4	8	38	10			37	18	16	10	40	9	6	20
BEPI	4	3	13	2			16	2	16	4				
LOHI	4	8	6	1			11	1			13	5		
BEPU	4	2			13	2								
ARPA	4	8			13	1								
GASH	12	18			13	1								
RHDI	4	3					11	2						

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
RILO	4	1							4	1	13	5	12	1
CEIN	4	8											6	1
ARNE	12	9												
GABU	12	2												
RULA			6	1	13	1	5	1					6	20
LOCI			13	1	13	1			8	2				
VAME			6	1	25	2					13	1		
RISA			19	2			5	1	8	1	7	3	6	8
COST			6	1			5	1						
RHPU			6	1					12	2				
SYAL			13	2							13	8	6	8
SALIX			6	1										
RHCA			6	2										
SOSI			6	1										
VACCI			6	T										
BERE							5	1	4	1				
PHLE2							11	1						
RIBES									8	2	7	3		
RICE											13	2	6	1
SARA											7	3		
LOCO											7	1		
OECE											7	1		
RIBI													41	4
RULE													6	3
ROSA													6	3
RICA													6	1
RICR														
RIVI														
LONIC														
RHMA														
TOTALS	100	32	100	59	100	36	100	73	100	49	100	46	100	27

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:														
ERHE2	4	1												
POHE2	4	1												
SAXIF	4	1												
SENEC	4	1												
FRAGA	4	2												
GATR	4	4												
VACH	4	7												
SESP	8	12												
VIOR2	36	2	56	2	38	2	16	1	16	2			12	2
XETE	12	6	6	3	13	35	5	1	4	20			6	20
ACTR	44	7	50	35	100	23	58	30	76	24	7	3	29	12
SMST	4	1	69	3	38	2	16	3	32	2	87	6	76	13
ARMA3	12	1	6	1	50	2	21	1	44	1	53	3	47	2
FRVEB	12	1	19	1	50	2	32	2	40	1	40	5	47	2
VIGL	12	1	31	1	50	2	16	2	20	2	40	2	41	3
ANDE	16	1	69	1	88	2	63	2	56	3	80	5	71	6
CASC2	24	1	13	2	75	2	11	2	64	4	27	2	53	9
TROV	24	1	63	1	63	1	32	1	36	1	73	3	47	2
GAAP	24	1	63	2	63	1	42	1	60	2	87	8	88	1
PTAQ	24	4	31	3	38	2	47	2	8	12	13	2	18	1
LIBOL	32	15	100	55	75	6	32	17	28	3	33	22	29	13
ADBI	36	4	69	7	100	3	42	2	72	5	60	1	88	6
HIAL	40	3	25	2	63	2	21	2	56	2	40	1	47	2
TRLA2	48	2	69	2	75	4	95	3	72	3	87	7	65	4
GOOB	72	2	75	1	88	2	95	1	56	1	33	1	53	1
LAPO	8	11	56	6	25	1	21	2	4	1	33	8	41	38
DIHOO	44	2	63	3	50	3	68	3	80	3	67	2	65	3
PHAD	24	2	19	2	63	3	42	2	56	3	13	1	41	5
PYPI	56	1	25	2	50	1	42	3	24	1	13	2	18	1
COMA3	36	1	25	1	13	1	42	1	28	1	7	1	29	1
PYSE	12	1	25	2	25	2	21	1	16	2	20	3	12	2
CLUN	8	1	75	2	63	2	32	3	20	3	27	3	24	7
SMRA	8	1	13	1			26	1	24	1	67	1	6	3
VIAM	12	7	19	1	38	1			12	2	13	3	41	20
POMU	44	2	44	10	50	1	47	4	40	2	20	1		

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
SYRE	20	3	50	3	38	2	11	1	36	3	7	1	18	3
VAHE	16	2	44	2	75	2	32	1	52	2	13	6	41	4
VECA	4	1	13	1	13	1	5	3	4	1	20	1	18	2
EBAU	4	1	13	1			11	1	4	1	7	1		
CAPR3	8	1	13	2	13	T	21	1	20	1			18	1
ASHA	12	1	6	20	25	2	16	2	32	2			6	1
HEMI	4	8	13	11			16	1	8	1	7	1	6	1
IRCH	20	2	6	1			11	1	8	1			6	1
OSCH	8	1	56	1			21	1					41	9
LICO3	4	1			38	1	5	T						
CABU2	12	1			13	1			4	1				
GAAM	8	2			13	1								
LIWA	4	1					5	1	12	1	13	1		
APAN	12	4					21	2	8	1				
CYGR	4	1					5	1	4	1				
SASA2	8	1					16	1						
PTAN	8	1					5	1						
OXOR	8	30					5	3						
ARLA	8	1							4	1	27	18	12	1
PENST	4	1							4	3				
TEGR	4	1							4	1				
LATHY	4	3									7	20	18	34
ERAL	4	1									13	2	12	2
ACMI	4	1											24	3
IRTEK	8	1											6	1
PYDE	8	1											6	1
LICA3	4	1												
HAUN	4	1												
MITR2			13	1	13	1	21	1	12	2	60	5	65	2
ACRU			6	1	13	3	11	2	8	1	87	6	47	3
COST2			13	1	25	1	16	1	20	1	7	3		
TITR			19	1	25	3	5	1			13	1	6	1
SADO			6	1	13	1	5	20					6	1
ANLY2			6	2	25	1			20	T	7	3	6	1
ASCA3			13	2			11	2	4	8	20	14	24	2

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
CIAL			6	1			5	1	4	0	13	2		
PERA			6	1			5	3			33	2		
PYAS			6	1			11	1	4	1				
GAOR			6	1					4	1	7	1		
AQFO			6	3							20	2	12	1
FRLA			6	1									6	1
ACCO			6	1										
CRPL			6	1										
MIGU			6	1										
PEFR2			6	1										
VIOLA					38	3	11	2	12	3			6	T
LOTUS					13	3			4	3	7	3		
MOSI					13	T			8	2	47	16	24	2
OSPU					50	3			12	2	13	3	18	3
VICIA					13	3			4	T				
MITEL					13	3								
ASBR					13	3								
NEHE							5	1			27	1		
LUAL							5	1						
PENE							5	1						
DRDI							5	1						
LUPIN							5	1						
OXTR							5	1						
VASI									4	1	20	3	6	1
DELPH									8	1	7	3	6	1
DIFO									4	3	7	3		
CAPU									8	1			6	1
MOUN2									4	1			6	1
PEAN									4	3				
MEBE									4	T				
HYOC									4	1				
HYFEA											20	18	6	3
MOOD											20	2	6	3
HYDRO											7	8	6	1
MOPE											13	1		

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
POPU											13	2		
COGR											13	1		
NEPA											13	1		
PHCO3											13	6		
VECU											13	1		
HADE											7	3		
HYCA											7	3		
ALLIU											7	1		
ATFI											7	1		
HELA											7	1		
SELA2											7	1		
SETR											7	1		
STACH											7	1		
AGUR											7	T		
ANAPH											7	T		
GERAN											7	T		
ERLA													6	8
PHEEP													12	1
COHE													6	1
ANAR2													6	1
LUAL2													6	80
ERUM													6	8
GIAG													6	8
ORIM													6	8
EPPA													6	3
ARGL													6	1
ARLU													6	1
HADI2													6	1
LIAP													6	1
LIPEL													6	1
ARCO														
TRRI														
POCA2														
MAMA														
SIHO														

TABLE 8 (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-LIDE3		ABCO-TABR		ABCO-CHLA		ABCO-PSME		ABCO/BENE		ABCO-AGCL		ABCO/Herb	
Number of Samples	25		16		8		19		25		15		17	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
ANNE														
BOST2														
COPA														
PEDE														
PHHA														
POCA5														
SEIN														
SICA2														
BRODI														
GABO														
LULE														
PICA														
POGL														
POMO3														
SEOR2														
TOTALH	100	28	100	108	100	66	100	46	100	48	100	82	100	98
GRASSES:														
CAREX	8	2											12	1
BROMU	8	1			13	3			8	1	7	3	18	3
FERU	20	3			13	3								
FESTU	4	T	6	1	25	3			8	6				
FESU	24	5	31	3	38	1			24	6			12	2
MESU					13	3			12	1	13	2	12	1
BRCA							16	1			13	1	35	1
FEOC							5	T						
POA									4	T			6	3
ELGL													6	3
MELIC													6	3
STOCH													6	3
TOTALG	100	2	100	1	100	2	100	T	100	2	100	1	100	2

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

TABLE 8a: CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:												
ELEV	100	4587	100	4439	100	4820	100	4708	100	4628	100	4899
ASPECT	100	91	100	346	100	181	100	309	100	4	100	140
SLOPE	100	30	100	37	100	36	100	41	100	43	100	42
TODPTH	100	37	100	37	100	32	100	36	100	41	100	38
TOTBA	100	371	100	289	100	302	100	284	100	247	100	334
TREE OVERSTORY:												
ABMAS			7	1	11	1	12	5	11	1	9	28
ABCO	43	16	100	36	78	11	88	27	78	26	84	41
PSME	100	46	93	33	89	20	88	41	89	27	78	44
CADE3	43	4	7	8	11	1	12	5	11	1	16	29
PILA	29	3	29	3	33	10	29	5	33	4	31	4
PIPO	14	1	14	6	67	14	59	9	89	16	31	6
CHLA	29	26	7	3								
PIAT							6	8				
PIBR	14	8										
PIMO	14	3	7	3								
PIJE							6	8			3	3
LIDE3											3	8
TOTALO	100	64	100	69	100	40	100	68	100	60	100	80
TREE UNDERSTORY:												
ALRU												
ACCI												
CADE3	71	3	29	4			18	1	22	1	31	3
ABCO	100	29	100	39	100	52	100	55	100	52	100	10
PSME	71	1	86	8	100	19	94	9	67	15	31	1
CACH	14	1	43	5	22	1	24	1	33	11	25	3
ARME			21	1	11	40	29	17	56	11	9	8
QUCH	14	1	21	3	11	1	24	7			3	1
TABR			21	1	11	20	6	1				
LIDE3					11	1					3	1
ACMA											3	1
PILA	29	1	14	3					11	1	3	1
PIPO			7	1					100	2		
CHLA	100	6										
PIAT			7	1								

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):												
QUVA	43	30	7	1								
QUSA	29	11										
ACGL			36	1			6	1				
ALSI												
QUKE			7	1							13	10
PREM							12	1			3	3
PIMO	14	3									6	2
PIBR	29	3										
TSME											3	3
PIJE											3	1
TOTALU	100	56	100	52	100	78	100	70	100	74	100	15
SHRUBS:												
LEDA												
GAOV												
GAFR												
RUNI												
PAMY	14	1	29	1			18	3	11	8	3	1
AMPA	29	2	36	1	33	1	53	2	33	8	38	1
SYMO	57	4	86	4	56	2	94	4	100	11	59	5
CHUM	100	4	64	3	56	4	47	2	33	1	13	1
ROGY	100	2	93	3	44	1	76	4	100	3	47	2
CHME	57	1	57	1	22	1	35	3			56	2
BENE	86	9	93	9			65	6	11	1	34	2
RUUR	57	2	36	2			18	1	11	1	25	2
RUPA	14	1	7	1			12	2	44	2	19	2
HODI	14	3					94	3	100	6	13	2
COCOC	29	1					12	2	11	1	19	1
WIMO	57	4	29	5			24	3	33	7	3	1
RILA					22	1					3	3
VAPA			14	1							3	1
CONU			7	1			18	4	11	1	3	3
BEPI							12	2	22	2	9	2
LOHI							6	1			3	8
BEPU	14	3	7	8								
ARPA			7	1			12	1			3	50
GASH												
RHDI												

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):												
RILO					11	1					3	1
CEIN							6	3				
ARNE	57	2	7	8	11	1					3	3
GABU							6	1				
RULA												
LOCI									11	3	3	1
VAME			7	1							3	1
RISA	14	8									3	1
COST												
RHPU											3	1
SYAL					11	3						
SALIX									11	1	6	2
RHCA												
SOSI												
VACCI												
BERE					22	1	24	2	22	5		
PHLE2							6	1				
RIBES												
RICE					11	1	6	20				
SARA												
LOCO												
OECE												
RIBI							6	1	11	1	6	1
RULE							6	3				
ROSA												
RICA												
RICR	14	1	7	1							3	1
RIVI			7	1	11	1	12	1			9	1
LONIC									11	1		
RHMA											3	1
TOTALS	100	25	100	21	100	6	100	22	100	29	100	10

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:												
ERHE2												
POHE2												
SAXIF												
SENEC												
FRAGA												
GATR												
VACH												
SESP												
VIOR2	14	1	7	1								
XETE	29	1	21	2			18	3	11	1	6	11
ACTR	43	3	29	4			6	2	11	3	22	3
SMST	14	1	29	2	11	20	53	3	11	3	34	1
ARMA3	14	1	14	1	44	2	65	1	11	1	41	1
FRVEB	29	1	29	2	11	1	47	1	44	3	25	2
VIGL	29	1	7	1	11	1	6	1	33	1	9	1
ANDE	43	1	43	1	22	1	59	1	33	2	25	1
CASC2	43	2	21	2	22	11	35	1	11	1	25	1
TROV	43	1	57	1	11	1	29	1	11	1	31	1
GAAP	14	1	50	1	22	12	53	1	22	1	38	1
PTAQ	29	1	29	2	11	1	12	2	11	1	28	1
LIBOL	57	5	36	2	22	12	29	6	22	29	9	3
ADBI	57	2	36	1	22	1	41	1	56	1	16	1
HIAL	29	1	43	1	33	1	24	2	33	2	25	2
TRLA2	57	3	64	2	44	2	82	1	56	2	38	2
GOOB	29	2	57	1	22	1	47	1	22	1	28	1
LAPO			14	5	11	1	35	3	22	2	3	1
DIHOO	29	1	57	1			65	2	22	2	19	1
PHAD	29	2	14	1			6	1	11	1	19	1
PYPI	71	1	43	1	22	1	12	1			19	1
COMA3	29	1	29	1	56	1	53	1			47	1
PYSE	43	1	29	2	11	1	18	2			13	3
CLUN	29	2	14	1	11	1	6	3			6	2
SMRA			29	1	11	1	12	2	22	1	16	1
VIAM	14	3			11	1	12	1	33	1	9	2
POMU			14	1	11	1	6	2	11	1	9	1

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):												
SYRE	29	2					6	1	22	2	6	2
VAHE	29	1	14	3			6	1			25	2
VECA	14	1	14	1							3	1
EBAU	14	1			44	1	29	1	11	1	25	1
CAPR3	14	1							11	1	6	1
ASHA			7	1							16	1
HEMI											6	5
IRCH	29	1					6	1			3	1
OSCH			7	1			18	1			16	1
LICO3	14	1									6	1
CABU2	29	1									3	1
GAAM	29	4										
LIWA			7	1							9	1
APAN			21	1								
CYGR							6	1				
SASA2					11	1						
PTAN											3	1
OXOR												
ARLA			21	2	11	3	12	5			6	5
PENST	14	1	7	1							3	3
TEGR											3	1
LATHY											3	1
ERAL											6	2
ACMI							12	2			9	2
IRTEK												
PYDE												
LICA3			7	1								
HAUN											3	1
MITR2			36	1	56	2	47	1	44	2	25	1
ACRU			14	1	11	1	47	1	11	1	3	3
COST2	14	1			11	1	12	1			3	1
TITR												
SAOO												
ANLY2	29	1	7	1			6	1			9	1
ASCA3					11	1					6	1

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):												
CIAL											6	2
PERA							12	1			6	5
PYAS												
GAOR			7	1							3	1
AQFO											3	1
FRLA			7	1	11	1	12	1				
ACCO												
CRPL												
MIGU												
PEFR2												
VIOLA			7	1							3	1
LOTUS											3	T
MOSI			14	1	22	5	6	1			9	2
OSPU											9	2
VICIA												
MITEL												
ASBR											6	1
NEHE			14	1	33	1	6	1			3	3
LUAL							6	1				
PENE											3	1
ORDI												
LUPIN												
OXTR												
VASI					11	1						
DELPH											13	1
DIFO												
CAPU			7	3					11	1	3	1
MOUN2												
PEAN							6	3				
MEBE												
HYOC												
HYFEA					11	1					6	1
MOOD											6	2
HYDRO											3	1
MOPE					11	1					3	1

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):												
POPU											3	1
COGR											3	1
NEPA											3	1
PHCO3												
VECU												
HADE												
HYCA												
ALLIU												
ATFI												
HELA												
SELA2												
SETR												
STACH												
AGUR												
ANAPH												
GERAN												
ERLA							6	3				
PHEEP											3	1
COHE											9	1
ANAR2											3	1
LUAL2												
ERUM												
GIAG												
CRIM												
EPPA												
ARGL												
ARLU												
HADI2												
LIAP												
LIPEL												
ARCO	14	1									3	1
TRRI	14	1										
POCA2					11	3						
MAMA							6	1			6	1
SIHO							12	1				

TABLE 8a (Cont): CONSTANCY TABLE FOR WHITE FIR ASSOCIATIONS

	ABCO-CHLA/Depauperate		ABCO-PSME/BENE		ABCO-PSME/Depauperate		ABCO-PSME/HODI		ABCO-PIPO		ABCO/SYMO	
Number of Samples	7		14		9		17		9		32	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):												
ANNE									11	1		
BOST2									11	1		
COPA											6	2
PEDE											3	8
PHHA											3	8
POCA5											3	3
SEIN											3	3
SICA2											3	3
BRODI											3	1
GABO											3	1
LULE											3	1
PICA											3	1
POGL											3	1
POMO3											3	1
SEOR2											3	1
TOTALH	100	14	100	15	100	18	100	18	100	16	100	15
GRASSES:												
CAREX												
BROMU											3	3
FERU	29	1	7	1								
FESTU												
FESH	14	1	7	1			12	1			9	4
MESU											3	T
BRCA			7	3			6	1	11	1	3	3
FEOC												
POA												
ELGL												
MELIC												
STOCM												
TOTALG	100	T	100	T	100	0	100	0	100	0	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

THE WESTERN HEMLOCK SERIES

The Species

The range of western hemlock (Tsuga heterophylla) extends from southern Alaska to northern California. A notable constriction of the range occurs in northern Curry and Josephine Counties where the Tyee sandstones of the Coast Range meet the Klamath Geological Province. From about Port Orford southward, western hemlock is confined to the windward side of the coastal mountains, where not only is there a major change in parent rock type and age, but there is also a major change in climate.

U.S. Weather Bureau data and satellite films show that storms and fog occur less frequently south of Port Orford and do not often penetrate beyond the coastal mountains. The average annual temperature at Bandon is about 1.5°F lower than at Gold Beach or Brookings. In addition, Gold Beach and Brookings are almost entirely frost free; whereas Bandon and Port Orford average about 275 frost free days. The combination of higher average temperatures, higher transpirational demand, and shallower soils in the Klamath province discriminates against western hemlock competition on inland sites south of Port Orford.

In the Siskiyous, western hemlock occurs mostly on northerly aspects. It seldom occurs on southerly slopes; only 3 of 70 observations were between aspects of 130° and 265°. Western hemlock occurs at an average elevation of 2109 feet, ranging between 200 and 4000 feet. Cover has a weak negative correlation with elevation ($r=-.15$). It occurs on all slopes, but only on the deeper Siskiyou soils. The average soil depth of western hemlock plots is 43 inches (one standard deviation is 10 inches), six inches deeper than the average soil depth for all Siskiyou plots.

Western redcedar (Thuja plicata) is an important species that occurs in the Western Hemlock Series. Its range is narrowly restricted in the Siskiyou Mountains. It was found only on the coastal Districts; on only seven plots. Six of these occurrences were in the understory tree layer within 25 miles of the coast. There are isolated inland pockets in cool, protected concavities, but no extensive stands. Like western hemlock it is sensitive to moisture and its range is constricted to a narrow coastal band south of Port Orford.

Because there are only seven plots, the statistics for western redcedar are weak but nevertheless interesting. The elevational distribution is from 200 to 3200 feet with an average of 1126 feet. Because it does occur above 7000 feet in the Cascades it is unlikely that cold temperatures are limiting in the Siskiyous; the average elevation may be much higher if all occurrences were found and sampled. All seven plots were on northerly aspects between 300° and 90° with an average slope of 46 percent. It occurs on all types of parent rock and soils. Some sites have high water tables while others are well drained. The average soil depth was 46 inches with a standard deviation of 10.

The Series

The Western Hemlock Series is restricted in occurrence to the windward side of the coastal crest and north of the Rogue River, except for isolated pockets. It is characterized by coastal species such as Pacific rhododendron (Rhododendron macrophyllum), evergreen huckleberry (Vaccinium ovatum), and Oregon wood-sorrel (Oxalis oregana). The flora is very similar to the flora of the western Cascades, except for the inclusion of tanoak (Lithocarpus densiflorus), Sadler oak (Quercus sadleriana), California laurel (Umbellularia californica), and Port-Orford-cedar (Chamaecyparis lawsoniana) which set it apart from the Cascade Mountain associations.

The Series occurs everywhere in the coastal environment. Slope, elevation, and aspect are not limiting. Its most outstanding environmental feature is soil depth: soils average 42 inches, six inches deeper than the average Siskiyou site. Sites within the Series are generally productive. Basal area can be as high as 600 square feet per acre. They also produce high shrub cover which can be serious competition for crop trees.

Western Hemlock Associations

Key to the Western Hemlock Associations

1a White fir present in the understory . . . . TSHE-ABCO (p112)

1b White fir absent in the understory 2

2a Western redcedar present 3

3b Below 3000 feet in elevation . . . . TSHE-THPL (p113)

3a Above 3000 feet in elevation . . TSHE-THPL/High elevation (p114)

2b Western redcedar absent 4

4a Port-Orford-cedar greater then 25% cover in overstory and understory combined; tanoak cover greater than 10% 5

5a Sadler oak present . . . . TSHE-QUSA (p115)

5b Sadler oak absent . . . . TSHE-CHLA (p116)

4b Not as above 6

6a California laurel present . . . . TSHE-UMCA (p119)

6a California laurel absent 7

7a Western hemlock dominates understory 8

8a Beargrass present or total shrub cover less than 10% . . . . TSHE/GASH (p117)

8b Beargrass absent and total shrub cover greater than 10% . . . . . . TSHE/RHMA (p118)

7b Tanoak dominates understory (also keys in Tanoak Series) LIDE3-TSHE (p120)

WESTERN HEMLOCK SERIES SUMMARY
TSHE N = 67

EXTENT: Coastal Districts and moist, protected pockets inland.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	1930	961	150-3720	Litter 91%, moss 30%, bareground 2%, and rock 5%.
Aspect (deg)	351	12	All Aspects	
Slope (%)	46	23	4-94	
Soil Depth (in)	42	12	12-50+	
Total BA (ft²)	265	84	60-600	

VEGETATION: (See pages 121-132 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	22	28	Common in TSHE Series
Douglas-fir (PSME)	52	97	Seral
western hemlock (TSHE)	34	36	Climax dominant
Tree Understory			
red alder (ALRU)	10	10	Moist sites
golden chinquapin (CACH)	15	19	Drier sites
Port-Orford-cedar (CHLA)	13	31	Variable, unknown indications
tanoak (LIDE3)	29	76	Slightly warmer sites
Douglas-fir (PSME)	9	27	Ubiquitous
western hemlock (TSHE)	34	100	Good growth at high densities
California laurel (UMCA)	26	30	Bottoms or near streams
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	9	70	Usually on deep soils
salal (GASH)	36	61	Dry site indicator when with XETE
Pacific rhododendron (RHMA)	32	78	Indications unknown
evergreen huckleberry (VAOV2)	32	46	Low elevation, wet
red huckleberry (VAPA)	5	46	Variable
western twinflower (LIBOL)	3	15	Rare on coastal sites
Oregon wood-sorrel (OXOR)	14	31	On wet sites
sword-fern (POMU)	33	75	On wet sites
white trillium (TROV)	2	22	Variable
beargrass (XETE)	5	30	Often on dry sites

WESTERN HEMLOCK - WHITE FIR
TSHE-ABCO N = 3

EXTENT: Crest area of coast range.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3600	111	3500-3720
Aspect (deg)	40	23	16-70
Slope (%)	50	34	25-89
Soil Depth (in)	50	0	50+
Total BA (ft²)	267	58	200-300

GENERAL DESCRIPTION

Often occurs on meta-sedimentary materials, primarily on ridgetops. Unlike the average TSHE association surface rock is high (32%) and moss cover is low (10%). Litter cover is also low (76%), but bareground is high (6%).

VEGETATION: (See page 121 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	19	67	Coclimax to minor climax
Douglas-fir (PSME)	43	100	Seral
western hemlock (TSHE)	43	67	Climax dominant
Tree Understory			
white fir (ABCO)	17	100	Good growth
western hemlock (TSHE)	33	100	Use may be risky
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	28	100	Occurs on soils 38" deep
Pacific rhododendron (RHMA)	25	100	Occurs on soils 39" deep
red huckleberry (VAPA)	3	100	Occurs on soils 34" deep
swordfern (POMU)	13	100	Occurs on soils 38" deep

DISCUSSION: This Association occurs in protected pockets along both sides of the coastal crest, usually south of the Rogue River, where the western limits of white fir and the eastern extension past the crest of western hemlock coincide. Localized occurrences can be found at lower elevations, particularly on deep soils. Highly localized sites are often too small to manage specifically for western hemlock but do offer

opportunities to maintain diversity on sites that have not been historically burned. Regeneration should be no problem, but vegetative competition from vine maple (<u>Acer circinatum</u>), Pacific rhododendron, and salal (<u>Gaultheria shallon</u>) will be severe. Forage production, even in transitory range condition, will be low; but hiding and thermal cover will provide shelter early in the rotation.

WESTERN HEMLOCK - WESTERN REDCEDAR
TSHE-THPL N = 6

EXTENT: Gold Beach and Powers Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	767	433	260-1460
Aspect (deg)	356	44	331-94
Slope (%)	49	16	19-60
Soil Depth (in)	46	11	24-50
Total BA (ft^2)	253	87	160-400

GENERAL DESCRIPTION

Occurs on a variety of parent materials, particularly sandstone or schist. Mostly on bottoms or lower 1/3 of flat topography. Litter (91%), moss (30%), bareground (2%), and rock (5%) are about normal for the Series.

VEGETATION: (See page 121 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	39	83	Seral
western hemlock (TSHE)	33	100	Climax
Tree Understory			
bigleaf maple (ACMA)	20	83	Usually high atmospheric moisture
tanoak (LIDE3)	16	100	Vegetation management problem
western redcedar (THPL)	12	100	Coclimax to climax
western hemlock (TSHE)	29	100	Good growth and yield
Shrub, Herb & Grass			
evergreen huckleberry (VAOV2)	24	67	Average elevation of 1514'
Oregon wood-sorrel (OXOR)	31	67	Average elevation of 1635'
sword-fern (POMU)	62	100	Highest covers on northerly aspects

DISCUSSION: Rarely found south of Port Orford, the TSHE-THPL Association differs from more northerly associations because of the occurrence of tanoak. The Association is not species rich and variation from site to site is slight. Most sites have not been recently or seriously burned, and are highly productive. Douglas-fir (*Pseudotsuga menziesii*), western

redcedar, and western hemlock are all appropriate, productive species for regeneration: Tanoak, evergreen huckleberry, bigleaf maple (*Acer macrophyllum*), vine maple, and possibly blue blossom ceanothus (*Ceanothus thrysiflorus*) will need to be controlled to maximize timber production. Evergreen huckleberry cover is negatively correlated with elevation (r=-.44) and will be less of a problem on the higher sites.

WESTERN HEMLOCK - WESTERN REDCEDAR/High elevation
TSHE-THPL/High elevation N = 1

EXTENT: Isolated protected pockets in the coastal crest portion.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3280	--	--
Aspect (deg)	56	--	--
Slope (%)	30	--	--
Soil Depth (in)	50	--	--
Total BA (ft^2)	300	--	--

GENERAL DESCRIPTION

Occurs on deep soils. Usually flat or concave. Litter is 99% and moss is 2%. Bareground and rock are non-existent.

VEGETATION: (See page 121 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
white fir (ABCO)	5	100	Seral to minor climax
Douglas-fir (PSME)	40	100	Seral
western hemlock (TSHE)	60	100	Climax dominant
Tree Understory			
western redcedar (THPL)	5	100	Grows on soils averaging 46"
western hemlock (TSHE)	40	100	Grows on soils averaging 43"
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	5	100	Averages 3468' in elevation
salal (GASH)	3	100	Averages 2460' in elevation
Pacific rhododendron (RHMA)	30	100	Averages 2330' in elevation
red huckleberry (VAPA)	1	100	Averages 3171' in elevation

DISCUSSION: The occurrence of western hemlock mixed with western redcedar above 3000 feet is rare in the Siskiyous. These isolated pockets may represent sites that rarely have been burned, possibly indicating the potential of the area after several hundred years without fire. It would be excellent diversity management to maintain these sites. The gene pool represented on these isolated sites is extremely valuable. Timber productivity is high and vegetation competition is significant.

WESTERN HEMLOCK - SADLER OAK
TSHE-QUSA   N = 2

EXTENT: Scattered on Illinois Valley and Gold Beach Districts, possibly Galice.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3520	28	3500-3540
Aspect (deg)	109	55	58-160
Slope (%)	35	21	20-50
Soil Depth (in)	26	2	25-27
Total BA (ft^2)	270	42	240-300

GENERAL DESCRIPTION

Occurs on all types of parent rock and topography but mostly limited to near ridge positions. Moss cover is very low (1%) compared to the Series average (30%). Rock and bareground are usually less than 1%.

VEGETATION: (See page 121 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	25	100	Seral
Douglas-fir (PSME)	43	100	Seral
western hemlock (TSHE)	30	50	Climax
Tree Understory			
Port-Orford-cedar (CHLA)	16	100	Good growth
Sadler oak (QUSA)	9	100	Modertely competitive
western hemlock (TSHE)	35	100	Fair growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	5	100	More cover on deeper soils
salal (GASH)	21	100	More cover on shallower soils
Pacific rhododendron (RHMA)	55	100	No preference for aspect
red huckleberry (VAPA)	3	100	Prefers northerly aspects
beargrass (XETE)	2	100	Occurs on soils averaging 35"

DISCUSSION: The Western Hemlock - Sadler Oak Association is a rarity. It is a diverse and unusual combination of species and environmental conditions. Shallow soil (26" average) and low moss cover (1 percent) indicate cool, dry conditions. Western hemlock is not often found in such an environment. A high moisture level is critical for the survival of western hemlock and this Association probably represents the extreme in western hemlock's ecological amplitude. Brush will be competitive and temperature extremes may occasionally depress the growth of the hemlock. Douglas-fir, Port-Orford-cedar, western hemlock, and incense-cedar (*Calocedrus decurrens*) are all appropriate for regeneration.

WESTERN HEMLOCK - PORT-ORFORD-CEDAR
TSHE-CHLA   N = 11

EXTENT: Mostly Powers District with some pockets on Gold Beach and possibly Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2496	501	1640-3460
Aspect (deg)	352	39	348-92
Slope (%)	43	21	15-80
Soil Depth (in)	46	7	30-50
Total BA (ft^2)	338	112	200-600

GENERAL DESCRIPTION

Occurs on schist, peridotite, serpentine, sandstone, gabbro, and granodiorite. Mostly upper 1/3 to ridgetop positions. Moss averages 46% indicating high levels of above ground moisture. Bareground and rock are about normal for the Series at 1% and 2%, respectively.

VEGETATION: (See page 121 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	29	82	Seral to minor climax
western hemlock (TSHE)	16	27	Climax dominant
Douglas-fir (PSME)	48	100	Seral
Tree Understory			
Port-Orford-cedar (CHLA)	17	91	Good growth
western hemlock (TSHE)	48	100	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	6	91	On better sites
salal (GASH)	36	73	Greater cover on poorer sites
Pacific rhododendron (RHMA)	22	91	Unknown indications
red huckleberry (VAPA)	7	82	Unknown indications
sword-fern (POMU)	16	100	Wet sites

DISCUSSION: Although there are pockets of Port-Orford-cedar inland, co-occurrence with western hemlock is restricted to a narrow coastal strip. Notable exceptions are Buckskin Peak on the west side of the Illinois Valley District and several pockets on the eastern portion of the Gold Beach District. All sites are generally wet and foggy with deep workable soils. Regeneration will not be a problem with Douglas-fir, western hemlock, or Port-Orford-cedar; and all will be very productive. With

Port-Orford-cedar, Phytophthera will be a serious risk, but less so on the inland sites. Forage production is low. Extreme measures would be required to control shrubs in favor of grass production. In fact, shrub control may even be necessary to maximize tree growth. Tanoak and Pacific rhododendron will provide the most serious competition.

WESTERN HEMLOCK/SALAL
TSHE/GASH N = 8

EXTENT: Mostly Powers District, scattered on Gold Beach and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2633	547	1900-3420
Aspect (deg)	342	93	All Aspects
Slope (%)	45	23	23-83
Soil Depth (in)	34	14	12-50+
Total BA (ft^2)	255	75	160-400

GENERAL DESCRIPTION

All topographic positions. Occurs on metasediments, granodiorite, greenstone, and sandstone. Litter (94%), bareground (1%), and rock (5%) are about normal for the Series. Moss cover (11%) is low.

VEGETATION: (See page 127 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	54	100	Seral
western hemlock (TSHE)	34	50	Climax dominant
Tree Understory			
Douglas-fir (PSME)	7	38	Good growth (mix with TSHE)
golden chinquapin (CACH)	21	50	On drier sites, shallower soils
tanoak (LIDE3)	14	63	Height growth very responsive to site
western hemlock (TSHE)	33	100	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	8	100	Better sites
salal (GASH)	49	88	Poorer sites
Pacific rhododendron (RHMA)	47	88	Unknown indications
evergreen huckleberry (VAOV2)	25	13	Wetter sites
red huckleberry (VAPA)	4	50	Unknown indications
beargrass (XETE)	5	88	Poorer sites

DISCUSSION: Although salal seems to be everywhere, it can be indicative of potential moisture stress problems particularly when it is associated with beargrass (*Xerophyllum tenax*). Soil depths are slightly lower

(5 inches on the average) than the average Siskiyou Mountain Province plot. The occurrence of moss is also lower. Altogether, indications point to a relatively dry site for the Western Hemlock Series. The absolute amount of cover indicates the degree of potential moisture stress; as salal and beargrass cover increases and surface moss cover decreases, potential moisture stress increases. Conversely, as the cover of evergreen huckleberry increases, potential for stress decreases. Although this is the driest association in the Series, it is still productive. Douglas-fir, in comparison with western hemlock, may be able to produce well in areas where moisture stress is high. A mixture is appropriate particularly when microsite planting is considered. Golden chinquapin (*Castanopsis chrysophylla*) is a good indicator of where Douglas-fir is appropriate.

WESTERN HEMLOCK/PACIFIC RHODODENDRON
TSHE/RHMA N = 7

EXTENT: Mostly Powers District; also Chetco.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1550	310	880-1860
Aspect (deg)	340	26	296-26
Slope (%)	61	21	30-90
Soil Depth (in)	42	13	24-50+
Total BA (ft²)	274	41	200-320

GENERAL DESCRIPTION

On metasediments, greenstone, diorite, and ultrabasics. Occurs on all types of topography from midslope to ridgetop positions. Litter (89%), moss (32%), bareground (2%), and rock (7%) are all about average for the Series.

VEGETATION: (See page 127 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	73	100	Seral
western hemlock (TSHE)	60	14	Climax dominant
Tree Understory			
tanoak (LIDE3)	11	86	Can be competitive
western hemlock (TSHE)	53	100	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	10	100	Slight preference northerly aspects
salal (GASH)	47	57	No apsect preference
Pacific rhododendron (RHMA)	20	100	No aspect preference
evergreen huckleberry (VAOV2)	30	86	No aspect preference
red huckleberry (VAPA)	4	57	Prefers northerly aspects
Oregon wood-sorrel (OXOR)	13	57	Wet sites
sword-fern (POMU)	45	86	Mostly wet sites

DISCUSSION: The occurrence of Pacific rhododendron is an indication of better soils and more available moisture where it supplants salal. Oregon wood-sorrel is a similar indicator but is more limited to soil surface layer indications. This Association was split from the

TSHE/GASH Association because of the importance of Pacific rhododendron as an indication of a higher productivity potential. As in the TSHE/GASH Association, beargrass and salal indicate decreasing site capability. The potential for using natural regeneration is high. Deer and elk, and their sign, are frequently sighted here.

WESTERN HEMLOCK - CALIFORNIA LAUREL
TSHE-UMCA N = 15

EXTENT: Chetco, Powers, and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	1023	409	150-1900	Sediment, metasediment, conglomerate, schist, and ultrabasic parent materials from bottoms to lower 1/3 on all types of topography. Litter cover low (85%) and moss cover is slightly high (42%). Good atmospheric moisture near streams.
Aspect (deg)	34	73	Mostly east	
Slope (%)	47	27	4-94	
Soil Depth (in)	47	7	30-50+	
Total BA (ft^2)	231	82	60-380	

VEGETATION: (See page 127 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	36	93	Seral
western hemlock (TSHE)	32	33	Climax dominant
Tree Understory			
western hemlock (TSHE)	33	100	Good survival and growth
California laurel (UMCA)	28	100	No vegetation management problems
tanoak (LIDE3)	11	86	Can be competitive
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	5	47	More cover on deeper soils
salal (GASH)	12	27	Less cover on deeper soils
Pacific rhododendron (RHMA)	33	60	No preference for soils
evergreen huckleberry (VAOV2)	31	80	Average soil depth 43"
red huckleberry (VAPA)	2	13	Variable
Oregon wood-sorrel (OXOR)	11	53	Wetter sites
sword-fern (POMU)	50	87	Ususally wet site

DISCUSSION: This Association usually occurs on bottoms or lower slope positions, is on deep soils, and is high in moss cover. Ground cover, usually composed of Oregon wood-sorrel and sword-fern, is high. Soils

may be gravelly in places but are usually moist. Both Douglas-fir and western hemlock will produce well, often from naturals. A mixture will be productive and usually need thinning to maintain optimum production. Control of Pacific rhododendron and evergreen huckleberry will often be necessary. Because it is often proximal to streams, the TSHE-UMCA Association is important to both fish and wildlife. Activities in this Association often have direct, as well as indirect, effects on the riparian ecosystem. Caution should be used particularly when dealing with schists and serpentine parent material types. They are prone to mass wasting.

TANOAK - WESTERN HEMLOCK
LIDE3-TSHE N = 12

EXTENT: Mostly Gold Beach and Powers Districts, with some on Chetco.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	1847	591	960-2740	Schist, serpentine, and metasediments on benches to ridgetops; mostly on flat slopes. All surface characteristics are about average. Litter is 92%; moss, bareground, and rock average 28%, 4%, and 5% respectively.
Aspect (deg)	352	103	All Aspects	
Slope (%)	46	23	10-85	
Soil Depth (in)	40	13	12-50+	
Total BA (ft^2)	253	56	140-340	

VEGETATION: (See page 127 for complete table) (Also keyed in the LIDE3 Series)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	67	100	Seral
Tree Understory			
tanoak (LIDE3)	59	100	Climax dominant
western hemlock (TSHE)	19	100	Coclimax
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	12	67	Better sites
salal (GASH)	43	92	Poor sites
Pacific rhododendron (RHMA)	40	92	No preference
evergreen huckleberry (VAOV2)	49	50	Lower wetter sites
sword-fern (POMU)	3	75	Wetter sites
beargrass (XETE)	10	42	Poorer sites

DISCUSSION: Timber productivity is high and forage production is low. Producing transitory range forage is difficult because tanoak provides excessive competition. Evergreen huckleberry, Pacific rhododendron, and salal can also be extremely competitive; early control is most efficient. Natural regeneration can be an asset with Douglas-fir and western hemlock being the most appropriate species for these sites. As with other associations beargrass cover indicates the poorer sites.

TABLE 9: CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE-ABCO		TSHE-THPL		TSHE-THPL/High		TSHE-QUSA		TSHE-CHLA	
Number of Samples	3		6		1		2		11	
	Cons[1] (%)	Mean[2] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:										
ELEV	100	3600	100	767	100	3280	100	3520	100	2496
ASPECT	100	40	100	356	100	56	100	109	100	352
SLOPE	100	50	100	49	100	30	100	35	100	43
TODPTH	100	50	100	46	100	50	100	26	100	46
TOTBA	100	267	100	253	100	300	100	270	100	338
TREE OVERSTORY:										
CADE3	67	5								
ABCO	67	19			100	5				
TSHE	67	43	100	33	100	60	50	30	27	16
PSME	100	43	83	39	100	40	100	43	100	48
PILA	33	15								
THPL			17	30						
CHLA			33	15			100	25	82	29
ABGR			50	8						
LIDE3			17	7						
TOTALO	100	93	100	80	100	105	100	83	100	76
TREE UNDERSTORY:										
ABCO	100	17								
CADE3	67	2								
ACGL	33	1								
ACCI	67	17	17	60					9	7
PSME	33	5	17	2					9	2

TABLE 9 (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE-ABCO		TSHE-THPL		TSHE-THPL/High		TSHE-QUSA		TSHE-CHLA	
Number of Samples	3		6		1		2		11	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):										
LIDE3	33	1	100	16					55	8
TSHE	100	33	100	29	100	40	100	35	100	48
QUSA	67	8					100	9		
PILA	33	1					50	15		
CACH	33	1					50	1	18	3
TABR	33	1							9	1
THPL			100	12	100	5				
CHLA			33	10			100	16	91	17
ALRU			17	15					9	7
ACMA			83	20					9	5
UMCA			83	19						
PIMO									9	15
QUCH										
ARME										
ABGR										
TOTALU	100	71	100	106	100	45	100	68	100	71
SHRUBS:										
SYMO	33	1								
COCOC	33	1	50	18						
RUUR	100	1	17	5					9	2
VAPA	100	3	17	1	100	1	100	3	82	7
GASH	67	11	17	2	100	3	100	21	73	36

TABLE 9 (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE-ABCO		TSHE-THPL		TSHE-THPL/High		TSHE-QUSA		TSHE-CHLA	
Number of Samples	3		6		1		2		11	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):										
CHUM	67	1			100	1	100	2	27	1
CHME	67	1			100	1	100	1	18	1
BENE	100	28			100	5	100	5	91	6
RHMA	100	25			100	30	100	55	91	22
ROGY	100	1							18	4
HODI	33	1								
RUPA			17	25						
RHDI			17	10						
PHCA3			17	5						
LOHI			17	1						
SAMBU			17	1						
VAOV2			67	24					18	13
RUSP			17	2						
RHOC									9	20
WHMO									9	1
FRLA2										
CONU										
RHCA										
ARCO3										
ARPA										
BEPI										
TOTALS	100	68	100	33	100	41	100	87	100	62

TABLE 9 (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE-ABCO		TSHE-THPL		TSHE-THPL/High		TSHE-QUSA		TSHE-CHLA	
Number of Samples	3		6		1		2		11	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:										
ANLY2	33	1								
ARLA	33	1								
CLUN	33	1								
GAOR	33	1								
TROV	33	1	17	1			100	1	27	1
TRLA2	33	1	17	2			50	1	9	1
ADBI	67	1	17	1						
SMST	33	2	17	1					9	1
TITR	33	4	33	1					18	1
ACTR	67	11	17	2					18	1
GAAP	67	1	33	6					9	1
OXOR	33	1	67	31					18	3
POMU	100	13	100	62					100	16
VIOR2	67	2	17	1					45	2
PTAQ	33	1	33	2					27	6
LIBOL	100	1			100	1	50	2	18	3
PYPI	67	1					100	1	27	1
XETE	33	1					100	2	18	5
ANDE	33	2							9	1
DIHOO	67	2							18	1
IRTEK	33	1							9	1
VAHE	67	1								
CASC2	67	1								
DIFO			17	1						
VIOLA			17	1						

TABLE 9 (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE-ABCO		TSHE-THPL		TSHE-THPL/High		TSHE-QUSA		TSHE-CHLA	
Number of Samples	3		6		1		2		11	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont)										
HIAL			17	1						
POHE2			17	1						
BLSP			17	5						
AGUR			17	1						
GOOB					100	1	100	1	36	2
PYAS							50	1		
LICA3							50	2		
DISM							50	1	18	1
MITR2									9	1
COST2									9	1
COMA3									9	1
HYMO									9	1
COLA									36	2
GATR									9	1
VIGL										
CAPR3										
MOSI										
SAXIF										
AQFO										
ATFI										
MOUN2										
ALVI										
BOST2										
PYDE										
TOTALH	100	33	100	89	100	2	100	9	100	24

TABLE 9 (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE-ABCO		TSHE-THPL		TSHE-THPL/High		TSHE-QUSA		TSHE-CHLA	
Number of Samples	3		6		1		2		11	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES:										
FESU	33	1	17	5						
HIOC									9	1
FEOC										
FESTU										
CAREX										
TOTALG	100	1	100	1	100	0	100	0	100	T

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

TABLE 9a: CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE/GASH		TSHE/RHMA		TSHE-UMCA		LIDE3-TSHE	
Number of Samples	8		7		15		12	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:								
ELEV	100	2633	100	1550	100	1023	100	1847
ASPECT	100	342	100	340	100	34	100	352
SLOPE	100	45	100	61	100	47	100	46
TODPTH	100	34	100	42	100	47	100	40
TOTBA	100	255	100	274	100	231	100	253
TREE OVERSTORY:								
CADE3								
ABCO								
TSHE	50	34	14	60	33	32	8	50
PSME	100	54	100	73	93	36	100	67
PILA	13	30					8	6
THPL								
CHLA			14	8	13	18	25	11
ABGR					13	28		
LIDE3					13	40		
TOTALO	100	75	100	83	100	56	100	74
TREE UNDERSTORY:								
ABCO								
CADE3								
ACGL								
ACCI	25	13	43	15	27	23		
PSME	38	7	14	1	33	2	33	12

TABLE 9a (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE/GASH		TSHE/RHMA		TSHE-UMCA		LIDE3-TSHE	
Number of Samples	8		7		15		12	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):								
LIDE3	63	14	86	11	93	34	100	59
TSHE	100	33	100	53	100	33	100	19
QUSA	13	5						
PILA	13	5					8	2
CACH	50	21	14	8	7	30	8	3
TABR								
THPL								
CHLA			29	1	13	7	25	15
ALRU	13	20	14	2	20	9		
ACMA	13	1	14	8	33	16	8	5
UMCA					100	28		
PIMO								
QUCH	13	8	14	5				
ARME	13	3	14	3	13	2	25	6
ABGR					7	15		
TOTALU	100	63	100	73	100	111	100	87
SHRUBS:								
SYMO								
COCOC					27	5		
RUUR			29	4	27	2	25	1
VAPA	50	4	57	4	13	2	25	10
GASH	88	49	57	47	27	12	92	43

TABLE 9a (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE/GASH		TSHE/RHMA		TSHE-UMCA		LIDE3-TSHE	
Number of Samples	8		7		15		12	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):								
CHUM								
CHME			43	1	7	1		
BENE	100	8	100	10	47	5	67	12
RHMA	88	47	100	20	60	33	92	40
ROGY			14	1	7	2	8	1
HODI	13	1					8	7
RUPA								
RHDI								
PHCA3								
LOHI								
SAMBU								
VAOV2	13	25	86	30	80	31	50	49
RUSP					13	4		
RHOC								
WHMO					13	2	8	2
FRLA2					7	8		
CONU					13	3	17	5
RHCA							8	10
ARCO3								
ARPA								
BEPI								
TOTALS	100	98	100	86	100	54	100	114

TABLE 9a (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE/GASH		TSHE/RHMA		TSHE-UMCA		LIDE3-TSHE	
Number of Samples	8		7		15		12	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:								
ANLY2								
ARLA								
CLUN								
GAOR								
TROV	25	1	43	1	20	2		
TRLA2			29	1	20	2	8	1
ADBI								
SMST								
TITR	13	1						
ACTR	13	1	14	1				
GAAP	13	1	29	1	20	1		
OXOR	25	14	57	13	53	11		
POMU	25	55	86	45	87	50	75	3
VIOR2	25	1	29	1	13	1	25	1
PTAQ			43	4	33	4	17	2
LIBOL	13	10					8	2
PYPI			14	1			17	1
XETE	88	5			13	3	42	10
ANDE								
DIHOO	13	1						
IRTEK			14	1				
VAHE					13	3		
CASC2					7	2		
DIFO								
VIOLA								

TABLE 9a (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE/GASH		TSHE/RHMA		TSHE-UMCA		LIDE3-TSHE	
Number of Samples	8		7		15		12	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):								
HIAL			14	1	7	1	8	1
POHE2			14	2				
BLSP			14	10	13	13		
AGUR					7	1		
GOOB	25	1	14	1	13	1	8	3
PYAS								
LICA3							8	1
DISM	13	1	43	1	20	1	25	1
MITR2								
COST2	25	1						
COMA3	13	1						
HYMO	13	1						
COLA	25	6			7	15		
GATR			14	1				
VIGL			14	2	13	1	8	1
CAPR3	13	1						
MOSI	13	1						
SAXIF					13	1		
AQFO					7	1		
ATFI					7	1		
MOUN2					7	1		
ALVI								
BOST2								
PYDE								
TOTALH	100	26	100	52	100	56	100	8

TABLE 9a (Cont): CONSTANCY TABLE FOR WESTERN HEMLOCK ASSOCIATIONS

	TSHE/GASH		TSHE/RHMA		TSHE-UMCA		LIDE3-TSHE	
Number of Samples	8		7		15		12	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES:								
FESU					7	1		
HIOC	13	1	43	1				
FEOC	13	2			7	1		
FESTU					7	1		
CAREX								
TOTALG	100	T	100	T	100	T	100	T

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE PORT-ORFORD-CEDAR SERIES

The Species

Port-Orford-cedar (Chamaecyparis lawsoniana) is confined, mostly by competition, to a narrow coastal range between Coos Bay and Eureka. However, it occurs eastward into the Siskiyou Mountains as far as Red Buttes; its inland distribution is associated with abundant soil and/or atmospheric moisture, and chemically imbalanced parent rock. Eighty percent of the Series' plots are near streams and 65 percent are in concavities which have morning fog and high daytime humidity. Even the seemingly dry sites on serpentine are often sub-irrigated by perched water tables.

Only 12 percent of the plots are on metamorphic or sedimentary materials. The rest are on granitics, alluvium, or ultrabasics. Port-Orford-cedar's tolerance of chemical imbalance allows it to compete well with other species on ultrabasics where moisture is abundant. But on well balanced soils it loses its competitive advantage. Thus, it is extremely sensitive to moisture availability but tolerant of chemical imbalance.

There is no correlation between Port-Orford-cedar cover and elevation in 209 observations. It occurs between sea level and 5100 feet without preference to aspect. The average elevation is 3150 feet, slightly below 3570 feet, the average elevation for the entire Siskiyou data set. It is likely that Port-Orford-cedar is tolerant of a wide range of temperatures and that low temperatures play a minor role in limiting its northern range. Above Coos Bay marine influence increases inland, but the parent rock is mostly Tyee sandstone and, therefore, western hemlock (Tsuga heterophylla) is more efficient. The average soil depth for plots with Port-Orford-cedar is 35 inches, 2 inches less than the average for all the Siskiyou plots. Thus, absolute depth may not be as important to distribution as other soil and topographic features.

The Series

The extent of the Series is even more limited than that of the species; but some of the Port-Orford-cedar associations are relatively important to managers because of their high productivity capacity. They have ample water, the most limiting factor for growth in the Siskiyous. Since they are near streams, the flora and fauna variation is rich and provides nutrients for fish production. Here, more than any other series, integrated resource management is critical to maintain the productivity of all forest resources.

Of the six associations, the Port-Orford-cedar/salal (Gaultheria shallon) is the most variable; a western twinflower (Linnaea borealis longifolia) variation was not split at this time because we feel management response will be similar throughout. Although there are few plots, the box-leaved silktassel (Garrya buxifolia) and huckleberry oak (Quercus vaccinifolia) associations were split because they are so distinctive floristically and we feel management response will be as distinctive.

Port-Orford-cedar Associations

Key to the Port-Orford-cedar Associations

1a Herbaceous cover about 50%; cleavers bedstraw, vanillaleaf, and white inside-out-flower all present; usually above 4000 feet in elevation . . . . CHLA/BENE/ACTR (p137)

1b Not as above 2

2a Pinemat manzanita present; huckleberry oak, and western white pine usually present 3

2b Not as above 4

3a Brewer spruce, dwarf Oregongrape, and white fir present . . . . CHLA-QUVA (p140)

3b Jeffrey pine, squawcarpet ceanothus, and box-leaved silktassel present . . . . CHLA/GABU (p141)

4a Riparian situation; bigleaf maple and red alder present . . . . CHLA-ACMA (p142)

4b Not as above 5

5a Salal present; golden chinquapin, Pacific rhododendron, and red huckleberry usually present . . . . . CHLA/GASH (p138)

5b Not as above . . . . CHLA/BENE/LIBOL (p139)

PORT-ORFORD-CEDAR SERIES SUMMARY
CHLA N = 35

EXTENT: West of costal crest in stream channels and areas with high occurrence of fog.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3424	875	1620-4650
Aspect (deg)	36	44	All
Slope (%)	34	21	0-75
Soil Depth (in)	35	11	20-70
Total BA (ft^2)	341	161	20-800

GENERAL DESCRIPTION

Occurs on all parent material types often in concave bottomland sites. Litter production is high 80%; moss is common at 25%; bareground is rare at 4%; and suface rock is relatively high at 20%.

VEGETATION: (See page 143 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	31	83	Climax dominant
white fir (ABCO)	7	37	Can be coclimax
Douglas-fir (PSME)	36	97	Good growth, good wildlife tree in drainages
Tree Understory			
Port-Orford-cedar (CHLA)	18	100	Good growth, shade tolerant
white fir (ABCO)	3	60	Good performer in this Series
tanoak (LIDE3)	5	40	On deeper or better soils
canyon live oak (QUCH)	2	29	On shallower soils
huckleberry oak (QUVA)	40	11	Usually on ultrabasic sites
Shrub, Herb & Grass			
box-leaved silktassel (GABU)	15	6	Ultrabasic indicator
dwarf Oregongrape (BENE)	5	77	On good sites with deep soils
sword-fern (POMU)	5	43	High cover value indicates wet sites
salal (GASH)	38	37	Indicates wet site only on inland districts

PORT-ORFORD-CEDAR/DWARF OREGONGRAPE/VANILLALEAF
CHLA/BENE/ACTR N = 4

EXTENT: Western Siskiyous, Illinois Valley, and possibly Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4340	214	4100-4540
Aspect (deg)	6	59	293-90
Slope (%)	48	6	40-55
Soil Depth (in)	33	4	29-38
Total BA (ft^2)	440	86	360-560

GENERAL DESCRIPTION

In concavities at valley bottoms, often not affected by fire. Cool, with about 2% moss. High litter cover: 92%. Bareground and rock 1% and 4% respectively.

VEGETATION: (See page 143 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	17	100	Climax
white fir (ABCO)	5	75	Seral to coclimax
Douglas-fir (PSME)	45	100	Strictly seral
Tree Understory			
Port-Orford-cedar (CHLA)	8	100	High *Phytophthora* risk along stream courses and roads
white fir (ABCO)	3	75	Mixes with grand fir and is not distinguishable
Shrub, Herb & Grass			
total herb	55	100	Herb rich with a variety of mesic herbs

DISCUSSION: Tree species listed in the overstory are equally appropriate for regeneration; all will grow well. This Association occurs on acid-igneous rocks and mixed metamorphics. The granites and diorites are highly erosive and should be treated accordingly. The potential for shrub competition is low but some treatment may be necessary. Mistletoe is a problem (particularly with Douglas-fir) which species mix may help reduce.

PORT-ORFORD-CEDAR/SALAL
CHLA/GASH N = 15

EXTENT: The most widespread CHLA association on the Siskiyou National Forest; mostly Illinois Valley and some on Gold Beach and Powers Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	3020	661	1620-4000	Parent rock ranges from serpentine to granodiorite,
Aspect (deg)	43	109	All Aspects	alluvium to metamorphic. High percentages of surface
Slope (%)	31	25	5-75	rock on serpentine and alluvium. Up to 80% moss
Soil Depth (in)	33	10	20-52	on warm, wet sites which tend to be concave.
Total BA (ft^2)	287	90	110-480	Bareground averages 1%.

VEGETATION: (See page 143 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	37	100	Seral, good growth
Port-Orford-cedar (CHLA)	34	87	Climax, good growth
Brewer spruce (PIBR)	7	65	Cold, wet high elevation, north aspect
white fir (ABCO)	5	13	Drier, colder extreme
Tree Understory			
Port-Orford-cedar (CHLA)	20	100	Dominant climax tree
tanoak (LIDE3)	6	60	Common, excellent growth
red alder (ALRU)	16	40	On wet sites and bottoms associated with ACCI
vine maple (ACCI)	8	27	Low elevation, warm, wet
canyon live oak (QUCH)	4	27	Not indicative of regeneration problems unless greater than 20% cover.
Shrub, Herb & Grass			
Pacific dogwood (CONU)	10	33	Another associate of ACCI and ALRU in warm wet sites
salal (GASH)	38	87	Dominant climax shrub
western twinflower (LIBOL)	8	80	Dominant climax herb
sword-fern (POMU)	8	47	Occurs on wetter sites
total shrub	74	100	High shrub cover

DISCUSSION: This Association is the most variable in the Port-Orford-cedar Series. All of the conifer species are appropriate for regeneration but care must be taken for proper placement. Vine maple (Acer circinatum), red alder (Alnus rubra), high cover of Pacific yew (Taxus brevifolia), Pacific dogwood (Cornus nuttallii), sword-fern (Polystichum munitum) and coolwort foamflower (Tiarella trifoliata) are the moist indicators in the Association. Port-Orford-cedar is certainly appropriate and will do well throughout the rotation. Control or management of competition is essential for maximum conifer growth.

Some stands lack the "moisture loving" species and support Douglas-fir (Pseudotsuga menziesii), canyon live oak (Quercus chrysolepis), and beargrass (Xerophyllum tenax). These stands are on the drier end of the scale. Here Douglas-fir would be appropriate in a mix with Port-Orford-cedar and white fir (Abies concolor). However, salal, Pacific rhododendron (Rhododendron macrophyllum), and tanoak (Lithocarpus densiflorus) may provide significant competition for the crop trees.

This is the "driest" of the Port-Orford-cedar Associations. Productivity is high and the fine to medium fuels that are produced occasionally dry enough to support fire. Thus risk, although low, is present.

PORT-ORFORD-CEDAR/DWARF OREGONGRAPE/WESTERN TWINFLOWER
CHLA/BENE/LIBOL N = 10

EXTENT: Illinois Valley to coast.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3600	980	1880-4500
Aspect (deg)	32	66	All Aspects
Slope (%)	32	17	10-55
Soil Depth (in)	43	14	23-70
Total BA (ft^2)	476	159	300-800

GENERAL DESCRIPTION

Occurs on lower 1/3 to bottom of slope on all parent rock types. Ground surface averages 20% rock and 4% bareground. Moss cover is about 20%; litter averages 88%.

VEGETATION: (See page 143 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	45	80	Best growth in bottom-land positions
Douglas-fir (PSME)	44	100	Seral, well protected from wind
Tree Understory			
Port-Orford-cedar (CHLA)	25	100	Very resistant to fire in bottoms - could last 2 rotations
white fir (ABCO)	3	70	Good growth, coclimax on lower 1/3
canyon live oak (QUCH)	2	50	Indications of surface rock and warm soils, dig soil pit.
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	8	80	Usually occurs on fair to good sites
total shrubs	17	100	Low total, probably because of lack of fire and healthy overstory

DISCUSSION: Most sites should have few regeneration problems. Regeneration difficulty will increase as the cover of canyon live oak increases. White fir, sugar pine (*Pinus lambertiana*), Port-Orford-cedar, and Douglas-fir are all appropriate for regeneration. Vine maple (*Acer circinatum*) and tanoak will need to be managed to allow maximum conifer growth.

PORT-ORFORD-CEDAR - HUCKLEBERRY OAK
CHLA-QUVA N = 3

EXTENT: Illinois Valley and possibly Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4407	221	4220-4650
Aspect (deg)	39	66	68-293
Slope (%)	48	8	40-55
Soil Depth (in)	38	2	36-40
Total BA (ft^2)	293	122	160-400

GENERAL DESCRIPTION

High moss cover with about 1% bareground. High surface rock and coarse topsoil. All samples were on granodiorite on flat slopes at the lower 1/3 of the slope.

VEGETATION: (See page 143 for complete table)

Tree Overstory	AVG % COVER	% CONS	REMARKS
Port-Orford-cedar (CHLA)	12	100	Climax, good growth
Brewer spruce (PIBR)	12	100	Seral, seeds in naturally
Douglas-fir (PSME)	12	100	Seral, good growth
white fir (ABCO)	8	100	Seral to coclimax
sugar pine (PILA)	12	67	Often occurs with PIMO, excellent growth
western white pine (PIMO)	8	67	Does well on cold sterile soils

Tree Understory	AVG % COVER	% CONS	REMARKS
Port-Orford-cedar (CHLA)	5	100	Shade tolerant
Brewer spruce (PIBR)	6	100	Does well in low light, cold wet
white fir (ABCO)	3	100	Will perform well, in survival and growth
Douglas-fir (PSME)	2	67	Resistant to fire
western white pine (PIMO)	2	67	Ribes is rare in this association
huckleberry oak (QUVA)	40	100	Dominant climax in shrub layer
Sadler oak (QUSA)	6	67	High elevation, cool wet

Shrub, Herb & Grass

dwarf Oregongrape (BENE)	5	100	Indicates that subsoil (B horizon) has some water holding capacity
pinemat manzanita (ARNE)	4	100	Indicates surface rock and/or coarse suface soil
heart-leafed arnica (ARCO)	1	100	
obscure bedstraw (GAAM)	1	100	

DISCUSSION: Regeneration can be difficult when top soils are coarse textured. This Association has additional problems because it occurs mostly on northerly aspects at high elevations. The soil remains cold late into the growing season inhibiting water uptake. As the soil warms it also quickly dries and moisture becomes limiting. Thus, timing of planting and seedling phenology is critical. Seedlings must be planted soon after the snow is gone but must remain inactive until the soil warms enough for uninhibited water uptake. If they are planted too late after the soil is warm there may not be much water available. Extreme variation in surface temperature adds to the stress. Brewer spruce (*Picea breweriana*) can withstand these stresses but is a slow grower. Port-Orford-cedar, although it can dominate, is not as efficient as sugar pine at using the resources of the site. All other conifers listed are equally appropriate for regeneration. Mixing species and microsite planting is recommended.

PORT-ORFORD-CEDAR/BOX-LEAVED SILKTASSEL
CHLA/GABU   N = 2

EXTENT: Coastal on ultrabasics, scattered and limited.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2740	453	2420-3060
Aspect (deg)	138	16	128-148
Slope (%)	42	17	30-54
Soil Depth (in)	28	6	24-32
Total BA (ft^2)	40	28	20-60

GENERAL DESCRIPTION

Ridge tops to upper 1/3 of slope with perched water table. No moss cover but about 30% bareground and 45% gravel. Litter cover is relatively low as is tree productivity.

VEGETATION: (See page 143 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
western white pine (PIMO)	12	100	Has slight affinity for ultrabasics
Jeffrey pine (PIJE)	6	50	Indication of ultrabasics
Port-Orford-cedar (CHLA)	10	50	Fair growth
Tree Understory			
Port-Orford-cedar (CHLA)	17	100	Coclimax, denser on wetter spots
Jeffrey pine (PIJE)	5	100	Coclimax
Douglas-fir (PSME)	5	50	Seral, poor growth
huckleberry oak (QUVA)	40	50	Seral, crosses with canyon live oak (QUCH)
Shrub, Herb & Grass			
box-leaved silktassel (GABU)	15	100	Ultrabasic indicator
pinemat manzanita (ARNE)	8	100	Shallow soil indicator
squawcarpet ceanothus (CEPR)	4	100	Soil stabilizer
cliff-brake (ASDE)	1	100	Ultrabasic indicator

DISCUSSION: This Association has Jeffery pine (*Pinus jeffreyi*) as coclimax but is wet enough for Port-Orford-cedar to domiate. California laurel (*Umbellularia californica*), California coffeeberry (*Rhamnus*

californica), and red huckleberry (*Vaccinium parvifolium*) are indicators of the wet extremes of the Association. Most sites have been burned. Knobcone pine (*Pinus attenuata*), western white pine (*Pinus monticola*), and Douglas-fir pioneer recently disturbed sites and can remain for over 100 years. Regeneration is appropriate with Port-Orford-cedar in the wet areas, Jeffrey pine on the dry, and Douglas-fir where the influence of the ultrabasic rock is minimal.

PORT-ORFORD-CEDAR - BIGLEAF MAPLE
CHLA-ACMA N = 1

EXTENT: Alluvial bottomlands, old bars, and terraces; inland.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	2480	--	--	Flat to slightly sloping riparian sites. Narrow stringers immediately near water. Moss and rock variable depending on the nearness to headwaters.
Aspect (deg)	Flat	--	--	
Slope (%)	Flat	--	--	
Soil Depth (in)	21	--	--	
Total BA (ft^2)	160	--	--	

VEGETATION: (See page 143 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
bigleaf maple (ACMA)	130		Adapted to sites with rocky soils and high humidities; loses its affinity to streams coastward and northward
red alder (ALRU)	8		Seral on good sites or near water; good stream cover; leaves enrich the stream
Tree Understory			
incense-cedar (CADE3)	3		Adapted to any site
Port-Orford-cedar (CHLA)	8		Coclimax near streams
Pacific yew (TABR)	8		Indicator of high humidity
Shrub, Herb & Grass			
cascara (RHPU)	3		Occasionally present
cleavers bedstraw (GAAP)	80		
sword-fern (POMU)	8		Common

DISCUSSION: This Association represents a small portion of the land but is important to water and fish production. Streamside vegetation is an essential part of stream protection and productivity. For example, bigleaf maple (*Acer macrophyllum*) and red alder provide shade, soil stability, and nutrient input for the stream.

Port-Orford-cedar is the most valuable timber species; Douglas-fir is often present. Both are important in maintaining stream quality, as are the hardwoods, and may be harvested while maintaining stream quality and stand diversity. This Association would be ideal for long rotations to provide forest diversity in structure and composition.

TABLE 10: CONSTANCY TABLE FOR PORT-ORFORD-CEDAR ASSOCIATIONS

	CHLA/BENE/ACTR		CHLA/GASH		CHLA/BENE/LIBOL		CHLA-QUVA		CHLA/GABU		CHLA-ACMA	
Number of Samples	4		15		10		3		2		1	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:												
ELEV	100	4340	100	3020	100	3600	100	4407	100	2740	100	2480
ASPECT	100	6	100	43	100	32	100	39	100	138	100	--
SLOPE	100	48	100	31	100	32	100	48	100	42	100	0
TODPTH	100	33	93	33	90	43	100	38	100	28	100	21
TOTBA	100	440	100	287	100	476	100	293	100	40	100	160
TREE OVERSTORY:												
TSHE			7	1								
ABCO	75	5	13	5	50	8	100	8				
CHLA	100	17	87	34	80	45	100	12	50	10		
PSME	100	45	100	37	100	44	100	12	50	5	100	20
PILA			20	9	10	3	67	12				
PIBR			7	65			100	12				
PIJE					10	1			50	6		
PIMO							67	8	100	12		
PIAT									50	6		
ACMA											100	130
ALRU											100	8
TOTALO	100	66	100	73	100	84	100	57	100	26	100	20
TREE UNDERSTORY:												
ACGL	25	3	7	3								
CACH	25	3	67	10	20	1						
ABCO	75	3	53	4	70	3	100	3				
PSME	25	3	60	5	40	4	67	2	50	5		
CHLA	100	8	100	20	100	25	100	5	100	17	100	8
TABR	25	1	60	5	50	9	67	2			100	8
ACCI			27	8	30	8						
ARME			7	1	10	3						
PILA			13	4	20	1						
QUSA			40	8	20	5	67	6				
PIBR			7	5			100	6				
LIDE3			60	6	40	3			50	5		
UMCA			7	15	20	6			50	2		
ACMA			13	5	10	3						
ALRU			40	16	10	8						

TABLE 10 (Cont): CONSTANCY TABLE FOR PORT-ORFORD-CEDAR ASSOCIATIONS

	CHLA/BENE/ACTR		CHLA/GASH		CHLA/BENE/LIBOL		CHLA-QUVA		CHLA/GABU		CHLA-ACMA	
Number of Samples	4		15		10		3		2		1	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):												
QUCH			27	4	50	2					100	T
ABMAS							33	1				
PIMO							67	2	100	18		
QUVA							100	40	50	40		
CADE3							33	3			100	3
PIJE									100	5		
PIAT									50	1		
TOTALU	100	13	100	53	100	41	100	63	100	66	100	157
SHRUBS:												
RIBES	25	3										
RILA	25	3										
HODI	50	2	13	3	20	1						
BENE	100	4	80	5	80	8	100	5				
CHUM	50	3	73	5	50	3	100	2				
ROGY	50	2	60	2	60	3	100	2				
CHME	50	2	47	1	70	1	67	1				
VAPA	25	1	93	5	30	2	100	5	50	2		
WHMO	25	3	33	3	40	3	33	1	50	1		
RUUR	25	1	60	3	70	2					100	8
COCOC	25	3	27	3	20	4					100	8
RULA	25	3			10	3						
GASH			87	38								
RHMA			60	29								
RUPA			20	3								
LOCI			7	3								
COHU			33	10	20	3						
VAME			20	2	10	3						
GAOV			13	2	10	3						
SARA			7	1	10	8						
PAMY			27	3	10	3	33	3				
AMPA			20	2			33	1				
RHOC			7	7					50	25		
SYMO			7	T	20	1					100	3
LOHI					10	1						

TABLE 10 (Cont): CONSTANCY TABLE FOR PORT-ORFORD-CEDAR ASSOCIATIONS

	CHLA/BENE/ACTR		CHLA/GASH		CHLA/BENE/LIBOL		CHLA-QUVA		CHLA/GABU		CHLA-ACMA	
Number of Samples	4		15		10		3		2		1	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):												
ARNE					10	1	100	4	100	8		
VASC							33	1				
BEPU							67	2	50	1		
GABU									100	15		
CEPR									100	4		
JUCO4									50	10		
RHCA									50	7		
PHLE2											100	8
RHPU											100	3
TOTALS	100	13	100	74	100	17	100	22	100	50	100	30
HERBS:												
ARMA3	25	1										
VIGL	50	2										
ASBR	25	1	20	2								
ASCA3	25	3	13	1								
LOTUS	50	3	7	1								
MITEL	25	3	7	1								
ACTR	100	11	40	3	50	3						
ADBI	100	3	33	2	50	1						
ANDE	100	3	27	2	20	1						
VAHE	100	3	20	1	40	1						
VIOLA	100	3	27	3	20	3						
CLUN	100	2	27	3	20	2						
DIHOO	100	2	40	1	40	2						
TITR	75	3	33	2	20	2						
PHAU	75	2	13	3	30	2						
PTAG	50	2	33	2	30	2						
PYSE	25	3	13	1	30	1						
COST2	25	1	7	1	10	1						
CASC2	100	2	7	3	30	1	33	3				
GOOB	75	2	87	2	80	1	100	1				
LIBOL	75	1	80	8	70	13	67	6				
HIAL	25	3	13	2	20	1	67	1				
PYPI	25	1	20	2	40	1	67	1				
POMU	50	2	47	8	40	4	33	1			100	8
SMST	50	2	33	1	30	2	33	1			100	8

TABLE 10 (Cont): CONSTANCY TABLE FOR PORT-ORFORD-CEDAR ASSOCIATIONS

	CHLA/BENE/ACTR		CHLA/GASH		CHLA/BENE/LIBOL		CHLA-QUVA		CHLA/GABU		CHLA-ACMA	
Number of Samples	4		15		10		3		2		1	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):												
TRLA2	100	3	53	2	80	2					100	3
OSPU	100	3	7	1	10	3					100	20
TROV	50	2	60	2	70	1					100	1
GAAP	100	3			30	3						100
ASHA	25	1					33	1				
CIAL	25	3									100	20
FRVEB	25	3									100	8
PYDE			20	1								
POHE2			13	2								
BOMA			7	15								
MITR2			7	3								
ARALI			7	2								
BLSP			7	2								
ADPE			7	1								
AGFO			7	1								
COSU			7	1								
DISM			7	1								
HYMO			7	1								
LILIU			7	1								
POMO3			7	1								
VICIA			7	1								
PYAS			60	2	10	1						
VIOR2			13	1	30	1						
COMA3			7	1	20	1						
ANLY2			7	1	10	1						
LICA3			7	1	10	1						
IRCH			7	1	10	0	67	1	100	1		
XETE			20	10			67	2				
SYRE					60	1						
LICO3					40	1						
CABU2					20	1						
VIAM					20	1						
ATFI					10	1						
CAPR3					10	1						
SASA2					10	1						

TABLE 10 (Cont): CONSTANCY TABLE FOR PORT-ORFORD-CEDAR ASSOCIATIONS

	CHLA/BENE/ACTR		CHLA/GASH		CHLA/BENE/LIBOL		CHLA-QUVA		CHLA/GABU		CHLA-ACMA	
Number of Samples	4		15		10		3		2		1	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):												
VECA					10	1						
VISE					10	1						
ERHE2					10	T						
SMRA					10	1	33	1			100	1
ARCO							100	1				
GAAM							100	1				
ASDE									100	1		
BRODI									50	1		
CATO									50	1		
LIWA									50	1		
PHDI									50	1		
SELI									50	1		
MOPA											100	20
MOSI											100	3
TEGR											100	1
TOTALH	100	55	100	28	100	26	100	12	100	5	100	173
GRASSES:												
FESTU	50	2										
FEOC			7	1								
FESU			13	2	10	T						
BROMU					10	3						
MESU					10	1						
POA									50	15		
CAREX									100	1		
TOTALG	100	1	100	0	100	1	100	0	100	9	100	0

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

THE TANOAK SERIES

The Series

Tanoak (Lithocarpus densiflorus) is not a wide ranging species. It is generally confined to areas influenced by the coastal climate. In Oregon most occurrences are in Curry and Josephine Counties with isolated occurrences in Jackson County. It seems to be sensitive to inland available summer moisture and cold temperatures. On the average it occurs at 2508 feet (980 feet is one standard deviation) but has been found as high as 5000 feet. It is usually found in the understory, highly tolerant of a thick cover of Douglas-fir (Pseudotsuga menziesii). Occasionally it may be found as the dominant overstory species on a site. These sites are lower in elevation and more moist than the average tanoak site.

The Series

The Series averages 1482 feet in elevation, is usually found with wet site indicators on the windward side of the coastal mountains, and has little evidence of recent fire occurrence. It is this warm, wet, uniform climate where tanoak dominates. Inland, fire occurrence is more common but the environment somewhat mimics coastal conditions. Cold temperatures limit its elevational, inland, and northerly distribution. Inland, fire occurrence is more common but the environment somewhat mimics coastal conditions.

Tanoak cover is negatively correlated with elevation ($r=-.37$). Its distribution is not related to aspect or slope in the Siskiyous; it does occur on deep soils: the average depth is 38 inches (one standard deviation is 13 inches). The deeper the soil, the greater the cover.

There are several aspects of the Series that are common to all the associations. All are potential vegetation management problems. Tanoak itself is a major problem on the inland associations. On the coast, salal (Gaultheria shallon), Pacific rhododendron (Rhododendron macrophyllum), and evergreen huckleberry (Vaccinium ovatum), as well as tanoak, are the major competitors. All associations are relatively productive. Usually tanoak can be used as an indicator of a productive site. Only 4 of the 19 associations can be regeneration problems. They are the LIDE3/RHDI-LOHI, LIDE3-QUCH/BENE, LIDE3-QUCH, and the LIDE3/BENE-RHDI Associations. Douglas-fir is appropriate for regeneration on all sites. Western hemlock (Tsuga heterophylla) in the coastal mixture would produce more biomass per acre. Sugar pine (Pinus lambertiana) becomes more appropriate in the transitional crest area and inland. Ponderosa pine (P. ponderosa) can be efficiently used on some of the hotter, problem sites.

All but a few of the coastal associations have been historically burned. Fire suppression has helped increase the cover and crown position of tanoak. It averages 36 percent cover on all occurrences in the Siskiyou plots. Average cover would increase if the stands were left undisturbed. A corresponding increase in duff and soil organic material would also be expected. On the other hand, without burning the difficulty of vegetation management control would increase with increased stored energy in the basal burls.

A unique feature of the Tanoak Series is the occurrence of coast redwood (Sequoia simpervirens). Its presence is rather limited on Forest Service administered lands in southwestern Oregon. All occurrences, regardless of the canopy layer, are included in this Association. The Association is represented by six plots, all of which occur on the Chetco District. The Series summary does not include this association and a separate constancy table is provided.

The range of the species coincides with the coastal belt of high summer atmospheric moisture. The heavy winter rains, moderate temperature extremes, and high fog occurrences all contribute to reduce transpiration rates and increased effective precipitation amounts. Annual precipitation may be increased as much as 25 percent under stands where fog is common. Because fog is a summer event, the occurrence of coast redwood can be interpreted as an indication of wet sites with moderate temperatures. Frost occurrence is likely the true northern limitation of its range under natural conditions. Mositure conditions similar to those of the Winchuck River drainage occur north of Port Orford in the Coast Range, yet coast redwood is not present; late spring and early fall frosts are more common there.

Coast redwood usually occurs in concavities on shallow to mild slopes. The Association occurs at an average elevation of 1130 feet. Total basal area averages 260 feet, but is primarily Douglas-fir.

Recognition of the associations may at times be difficult. They are floristically similar and recognition may depend on estimating the absolute amount of cover. Even if a site is misidentified the key is constructed so that usually the most similar association is selected.

Tanoak Associations

* Described in the Western Hemlock Series.

tanoak / California coffeeberry LIDE3/RHCA
Lithocarpus densiflorus / Rhamnus californica p167

tanoak / salal - Pacific rhododendron LIDE3/GASH-RHMA
Lithocarpus densiflorus / Gaultheria shallon - Rhododendron macrophyllum p168

tanoak / salal - dwarf Oregongrape LIDE3/GASH-BENE
Lithocarpus densiflorus / Gaultheria shallon - Berberis nervosa p169

tanoak - vine maple LIDE3-ACCI
Lithocarpus densiflorus / Acer circinatum p170

tanoak / white fir - vine maple LIDE3-ABCO-ACCI
Lithocarpus densiflorus / Abies concolor - Acer circinatum p171

tanoak - white fir LIDE3-ABCO
Lithocarpus densiflorus / Abies concolor p172

tanoak / dwarf Oregongrape LIDE3/BENE
Lithocarpus densiflorus / Berberis nervosa p173

tanoak / dwarf Oregongrape - poison oak LIDE3/BENE-RHDI
Lithocarpus densiflorus / Berberis nervosa - Rhus diversiloba p174

tanoak - canyon live oak LIDE3-QUCH
Lithocarpus densiflorus / Quercus chrysolepis p175

tanoak - canyon live oak / dwarf Oregongrape LIDE3-QUCH/BENE
Lithocarpus densiflorus / Quercus chrysolepis / Berberis nervosa p176

tanoak / poison oak - hairy haneysuckle LIDE/RHDI-LOHI
Lithocarpus densiflorus / Rhus diversiloba - Lonicera hispidula p177

Key to the Tanoak Associations

1a Western hemlock or coast redwood present 2

2a Coast redwood present LIDE3-SESE2 (p158)

2b Coast redwood absent *LIDE3-TSHE (p120)

1b Western hemlock and coast redwood absent 3

3a California laurel present 4

4a Port-Orford-cedar and California coffeeberry absent LIDE3-UMCA (p161)

4b Port-Orford-cedar and/or California coffeeberry present and/or poison oak cover greater than 30% 15

3b California laurel absent 5

5a Pacific rhododendron present 6

6a Evergreen huckleberry present 7

7a Salal and California coffeebery absent LIDE3/RHMA (p162)

7b Salal and/or California coffeebery present 8

8a Port-Orford-cedar, Pacific dogwood, and California coffeeberry absent . . . LIDE3/RHMA-VAOV2 (p163)

8b Port-Orford-cedar, Pacific dogwood, and/or California coffeeberry present 15

6b Evergreen huckleberry absent 9

9a Port-Orford-cedar and white fir absent . . . 10

10a Creeping snowberry and western twinflower absent LIDE3/RHMA-GASH (p164)

10b Creeping snowberry and/or western twinflower present LIDE3/GASH-RHMA (p168)

9b Port-Orford-cedar and/or white fir present 15

5b Pacific rhododendron absent 11

* See the Western Hemlock Series for description.

11a Evergreen huckleberry present 12

12a Port-Orford-cedar, Pacific rhododendron, and poison oak absent 13

13a Red huckleberry absent; sugar pine, if present, not in both overstory and understory 14

14a Salal present LIDE3/VAOV2-GASH (p159)

14b Salal absent LIDE3/VAOV2 (p160)

13b Red huckleberry present or sugar pine in both overstory and understory 15

12b Port-Orford-cedar, Pacific rhododendron, and/or poison oak present 15

11b Evergreen huckleberry absent 15

15a Salal present 16

16a Port-Orford-cedar absent in understory 17

17a Pacific rhododendron and/or thin-leaved huckleberry present . . . LIDE3/GASH-RHMA (p168)

17b Pacific rhododendron and thin-leaved huckleberry absent 18

18a Poison oak and vine maple absent; two or fewer of the following present: sword-fern, Oregon fairy-bell, bracken, and western rattlesnake-plantain LIDE3/GASH (p165)

18b Poison oak and/or vine maple present; three or more of the above (18a) present 20

16b Port-Orford-cedar present in understory 19

19a Evergreen huckleberry, Pacific rhododendron, poison oak or white vein pyrola (do not confuse this with western rattlesnake-plaintain) present LIDE3-CHLA (p166)

19b None of the above present 20

20a Vine maple absent 21

21a Western Solomon plume absent LIDE3/GASH-BENE (p169)

21b Western Solomon plume present 23

20b Vine maple present 23

15b Salal absent 22

22a California coffeeberry present in combination with red huckleberry and/or California laurel LIDE3/RHCA (p167)

22b California coffeeberry absent; if present, neither red huckleberry nor California laurel present 23

23a Vine maple and/or white fir present 24

24a White fir absent LIDE3-ACCI (p170)

24b White fir present 25

25a Vine maple present LIDE3-ABCO-ACCI (p171)

25b Vine maple absent LIDE3-ABCO (p172)

23b Vine maple and white fir absent 26

26a Poison oak absent 27

27a Port-Orford-cedar present in understory LIDE3-CHLA (p166)

27b Port-Orford-cedar absent in understory 28

28a Baldhip rose present . . . LIDE3/BENE (p173)

28b Baldhip rose absent . . . LIDE3/GASH (p165)

26b Poison oak present 29

29a Hairy honeysuckle absent 30

30a Dwarf Oregongrape cover greater than 10% . . . LIDE3/BENE-RHDI (p174)

30b Dwarf Oregongrape absent or cover less than 10%; if not, then creambush oceanspray present LIDE3-QUCH (p175)

29b Hairy honeysuckle present 31

31a Dwarf Oregongrape cover greater than 10% LIDE3-QUCH/BENE (p176)

31b Dwarf Oregongrape absent or cover less than 10% . . LIDE3/RHDI-LOHI (p177)

TANOAK SERIES SUMMARY
LIDE3 N = 251

EXTENT: Siskiyou National Forest only.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2400	872	140-4550
Aspect (deg)	8	57	All
Slope (%)	41	20	0-92
Soil Depth (in)	38	13	0-72
Total BA (ft^2)	262	102	20-560

GENERAL DESCRIPTION

Average litter cover is 83%, average moss cover is 25%, average bareground cover is 3%, and average rock cover is 8%.

VEGETATION: (See pages 178-201 for complete tables)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	59	99	All associations, good growth
sugar pine (PILA)	10	37	Mostly inland associations
Tree Understory			
tanoak (LIDE3)	50	100	Can be vegetation management problem
Douglas-fir (PSME)	7	70	Ubiquitous
Pacific madrone (ARME)	11	48	Common in Tanoak Series
golden chinquapin (CACH)	16	29	Mostly on ridges
white fir (ABCO)	6	13	On good sites in the Series
canyon live oak (QUCH)	13	46	On poor sites in the Series
Shrub, Herb & Grass			
salal (GASH)	42	38	Usually higher cover on poorer sites
evergreen huckleberry (VAOV2)	36	32	Most common in Tanoak Series
Pacific rhododendron (RHMA)	36	30	Coastal climate, low elevation
dwarf Oregongrape (BENE)	14	62	Greater cover on better sites
baldhip rose (ROGY)	3	45	Ubiquitous
creeping snowberry (SYMO)	3	22	More common on drier sites
poison oak (RHDI)	9	25	Indicator of hot sites
hairy honeysuckle (LOHI)	3	17	Indicator of hot sites with RHDI
sword-fern (POMU)	4	55	Can also be on relatively dry sites
beargrass (XETE)	6	25	High cover indicates poor sites
bracken (PTAQ)	3	39	Not a good indicator
vanillaleaf (ACTR)	6	33	Usually on soils with good surface characteristics
western twinflower (LIBOL)	11	20	Common in Tanoak Series

TANOAK-COAST REDWOOD
LIDE3-SESE2 N = 6

EXTENT: Chetco District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1130	150	960-1340
Aspect (deg)	310	75	SW-NE
Slope (%)	28	15	3-45
Soil Depth (in)	42	13	20-50
Total BA (ft^2)	260	79	160-340

GENERAL DESCRIPTION

Medasedimentary parent materials; located usually in concavities on northerly exposures. Litter cover is high (98%); moss is 16%, bareground is less than 1%, and rock is 2%.

VEGETATION: (See page 178 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	55	100	Dominant seral
coast redwood (SESE2)	31	83	Seral
Tree Understory			
tanoak (LIDE3)	48	100	Climax dominant
western hemlock (TSHE)	21	50	Seral to coclimax
Douglas-fir (PSME)	3	50	Seral
coast redwood (SESE2)	24	33	Seral to coclimax
Oregon myrtle (UMCA)	11	33	High above ground moisture
Shrub, Herb & Grass			
evergreen huckleberry (VAOV2)	57	100	Ubiquitous
Pacific rhododendron (RHMA)	22	67	Ubiquitous
red huckleberry (VAPA)	4	67	Wetter sites
salal (GASH)	17	50	Drier sites
sword-fern (POMU)	22	83	Ubiquitous
round-leaved violet (VIOR2)	1	83	Ubiquitous

DISCUSSION: This Association offers an opportunity to maintain diversity with the presence of coast redwood. Productivity on these sites is relatively high due to the high moisture availability and reduced evapotranspiration rates. Appropriate species for regeneration include

Douglas-fir, western hemlock, and coast redwood. Tanoak is abundant in the understory; and in the absence of fire, and other disturbances, is the climax dominant. Its high cover will be regeneration barrier and provide intense competition. Several shrub species, including evergreen huckleberry, Pacific rhododendron, and possibly blue-blossom ceanothus (Ceanothus thyrsiflorus) will also compete with regeneration. Coast redwood reproduces vegetatively from stump sprouts and less so from seed. Natural seedling establishment requires mineral soils which are not often present due to the high litter and moss cover.

TANOAK/EVERGREEN HUCKLEBERRY - SALAL
LIDE3/VAOV2-GASH N = 6

EXTENT: Gold Beach and Chetco Districts, possibly Powers District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2043	279	1700-2340
Aspect (deg)	40	70	Mostly NE
Slope (%)	31	17	10-46
Soil Depth (in)	44	7	30-50+
Total BA (ft²)	207	53	140-280

GENERAL DESCRIPTION

Generally metasediments and sandstone to mudstone. Litter and bareground about normal for the Series at 86% and 2%, respectively. Moss cover is high at 45% and rock cover is low at 2%.

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	75	100	Seral
Tree Understory			
tanoak (LIDE3)	64	100	Climax
Shrub, Herb & Grass			
salal (GASH)	18	100	Greater cover on poorer sites
evergreen huckleberry (VAOV2)	36	100	Competition for trees
sword-fern (POMU)	2	67	Greater cover on moister sites
beargrass (XETE)	4	67	On poorer sites

DISCUSSION: This Association was split from the LIDE3/VAOV2 Association because salal is indicative of a drier, less hospitable site. As the salal and beargrass (*Xerophyllum tenax*) cover increases, site productivity usually decreases. It is possible that the greater the height of the salal the better the site, as in site index with trees. The major silvicultural problems with this Association will be controlling competing vegetation (both site preparation and brush control may be necessary) and subsequent control of tree stocking levels. Douglas-fir and western hemlock will both perform well. High levels of atmospheric moisture will allow naturals to survive.

TANOAK/EVERGREEN HUCKLEBERRY
LIDE3/VAOV2 N = 10

EXTENT: Gold Beach, Chetco, and possibly Powers Districts

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1220	748	140-2400
Aspect (deg)	157	107	All
Slope (%)	38	24	4-78
Soil Depth (in)	46	7	30-50+
Total BA (ft^2)	224	70	120-320

GENERAL DESCRIPTION

Often on schists, conglomerates, and metasediments. Occurs on lower 1/3 of the slopes and benches. Usually on flat topography, sometimes concavities. Low rock cover at 4%, litter 84%, moss 23%, and bareground 4% about normal for the Series.

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	65	100	Seral
Tree Understory			
tanoak (LIDE3)	85	100	Climax
Shrub, Herb & Grass			
evergreen huckleberry (VAOV2)	52	100	Common, competitive
sword-fern (POMU)	4	60	Greater cover on moister sites

DISCUSSION: Deep fertile soils, moderate temperatures, and high atmospheric moisture combine for a productive site. With adequate site preparation and vegetation management, the major problem will be to maintain optimum stocking levels, thereby maximizing production. Planted seedlings (both Douglas-fir and western hemlock are appropriate) will have to compete with an influx of naturals. Thinning to maintain a mixture is desirable in terms of timber productivity. Distinction from the LIDE3/VAO2-GASH Association may be difficult. High cover of sword-fern and low cover of salal in this Association will help in the determination.

TANOAK - CALIFORNIA LAUREL
LIDE3-UMCA N = 24

EXTENT: Mostly Chetco and Gold Beach, some on Powers Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	1174	565	180-2280	All types of metasedimentary materials. Mostly lower 1/3 to bottomland sites. Moss is slightly higher than Series average at 32%. Slightly less litter but bareground and rock about normal at 2% and 10% respectively.
Aspect (deg)	305	110	All Aspects	
Slope (%)	47	23	7-92	
Soil Depth (in)	43	11	10-50	
Total BA (ft^2)	243	84	20-400	

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS.	REMARKS
Tree Overstory			
Douglas-fir (PSME)	60	100	Seral
Tree Understory			
red alder (ALRU)	28	17	Seral
Pacific madrone (ARME)	12	33	Seral
California laurel (UMCA)	22	100	Seral
tanoak (LIDE3)	63	96	Climax
Shrub, Herb & Grass			
Pacific rhododendron (RHMA)	20	46	Ubiquitous on coastal sites
evergreen huckleberry (VAOV2)	46	79	Ubiquitous on coastal sites
sword-fern (POMU)	10	79	Common on moist sites
bracken (PTAQ)	2	46	Common

DISCUSSION: Bottomlands and streams characterize this Association. As would be expected, atmospheric moisture is high. Red alder (*Alnus rubra*) is common in the seral stages and provides significant competition. Pacific madrone (*Arbutus menziesii*), "inland alder," plays the same role as alder on the drier, usually more upland sites. Pacific madrone is not an indicator of poor sites. It requires favorable conditions to survive. It is sensitive to cold and moisture stress. Although the average soil depth is 43 inches, soils can be shallow (10 inches) and physically limiting on alluvial sites. High atmospheric moisture seems to compensate for poor soils in these cases. It would speed reforestation

if naturals were planned for on the bottomland alluvial sites. Because vegetation management options are limited near streams it is essential that site preparation and planting take place immediateley. Many animals and fish are dependent on the integrity, structure, and composition of the vegetation, particularly near the larger streams. The small upland drainages are also important, but the emphasis changes to watershed values. The downstream impact on water quality is dependent on the intensity and extent of operations as well as the duration.

TANOAK/PACIFIC RHODODENDRON
LIDE3/RHMA N = 7

EXTENT: Chetco and Gold Beach Districts, possibly Galice District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1240	449	660-1980
Aspect (deg)	344	57	Mostly NW
Slope (%)	44	21	18-85
Soil Depth (in)	45	6	36-50+
Total BA (ft^2)	254	73	120-320

GENERAL DESCRIPTION

Generally metasediments, i.e., schists and sandstones. Usually on lower 1/3 of slope to ridgetops, on mostly flat but sometimes convex topography. Very little surface rock (1%); other values about normal for the Series.

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	45	100	Seral
Tree Understory			
tanoak (LIDE3)	89	100	Climax
Shrub, Herb & Grass			
Pacific rhododendron (RHMA)	43	100	Ubiquitous on coastal sites
evergreen huckleberry (VAOV2)	55	100	Ubiquitous on coastal sites

DISCUSSION: Soils are deep and fertile, temperatures are moderate, and moisture is plentiful. Shrub competition is the major silvicultural problem. Litter fall is high and is rapidly incorporated into the soil. Maintained nutrient cycling assures continued productivity of the site. Sandstones can be erosive. It is important to treat these sites lightly.

TANOAK/PACIFIC RHODODENDRON - EVERGREEN HUCKLEBERRY
LIDE3/RHMA-VAOV2 N = 21

EXTENT: Chetco and Gold Beach Districts; possibly Powers and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1882	488	1040-2820
Aspect (deg)	14	79	Mostly N
Slope (%)	34	16	0-65
Soil Depth (in)	43	9	20-50+
Total BA (ft^2)	203	71	120-360

GENERAL DESCRIPTION

All parent rock types from bottoms to ridgetops on all types of slope. Very little rock (1%) and no bareground. Litter is 94% and moss averages 23%.

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	56	100	Seral
Tree Understory			
tanoak (LIDE3)	72	100	Climax
Douglas-fir (PSME)	4	76	Excellent growth potential
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	20	76	On better sites
salal (GASH)	31	100	Greater cover on shallow soils
Pacific rhododendron (RHMA)	41	100	On deeper soils
evergreen huckleberry (VAOV2)	27	100	At lower elevations
sword-fern (POMU)	8	38	On wetter sites
bracken (PTAQ)	3	62	Common
beargrass (XETE)	6	57	On poorer sites

DISCUSSION: Similar in response to the LIDE3/RHMA Association, this Association has more intense shrub competition, and sites with beargrass have soil properties that may limit growth. Most regeneration problems will occur on southerly aspects that have over 15 percent cover of beargrass.

TANOAK/PACIFIC RHODODENDRON - SALAL
LIDE3/RHMA-GASH N = 14

EXTENT: Chetco, Gold Beach, Powers, and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2809	324	2440-3400
Aspect (deg)	30	85	All
Slope (%)	28	15	3-53
Soil Depth (in)	33	15	0-50+
Total BA (ft^2)	267	88	140-480

GENERAL DESCRIPTION

Mostly metasediments; schists and diorite at times. All slopes and positions. All surface discriptor values about normal for the Series: litter is 85%, moss is 18%, rock is 5%, and bareground is 2%.

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	71	100	Seral
Tree Understory			
tanoak (LIDE3)	36	100	Climax
Douglas-fir (PSME)	7	71	Excellent growth potential
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	17	71	On better sites
salal (GASH)	52	100	Mostly coastal in LIDE3 Series
Pacific rhododendron (RHMA)	48	100	On deeper soils
beargrass (XETE)	8	71	On poorer sites

DISCUSSION: Soils in this Association are, on the average, 10 inches shallower than most other coastal associations. This Association often occurs on diorite, a relatively infertile parent rock. Salal cover will usually be higher on diorite and shallow metasediments, indicating the poorer sites in the Association. The lack of evergreen huckleberry and the common occurrence of dwarf Oregongrape (*Berberis nervosa*) indicate the transition from totally coastal climate to more inland conditions where temperature and moisture are more variable. Sugar pine should be added to the list of appropriate species with Douglas-fir, western hemlock, Port-Orford-cedar (*Chamaecyparis lawsoniana*), western redcedar (*Thuja plicata*), and incense-cedar (*Calocedrus decurrens*). Management should be much the same as other coastal tanoak associations.

TANOAK/SALAL
LIDE3/GASH N = 14

EXTENT: Chetco, Gold Beach, and some on Galice District; possibly Illinois Valley District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2477	360	1740-2860
Aspect (deg)	345	101	All
Slope (%)	43	23	0-83
Soil Depth (in)	41	11	20-50+
Total BA (ft^2)	267	56	160-360

GENERAL DESCRIPTION

Metasediments, i.e., schists and sandstones. All positions and slopes. Low moss cover (14%), low rock cover (4%), litter (86%), and bareground (2%).

VEGETATION: (See page 181 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	75	100	Seral
Tree Understory			
tanoak (LIDE3)	73	100	Climax
Douglas-fir (PSME)	15	79	Excellent growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	10	50	On better sites
salal (GASH)	40	64	Greater cover poorer sites
sword-fern (POMU)	2	64	On better LIDE3 sites

DISCUSSION: Most management problems will be associated with sites that have rock in the surface layers of the soil. Tanoak and salal will compete for site resources with the crop trees. Early control is most efficient.

TANOAK - PORT-ORFORD-CEDAR
LIDE3-CHLA N = 15

EXTENT: Mostly Gold Beach, some on Galice and possibly on the Chetco District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2160	834	180-3380
Aspect (deg)	348	116	All
Slope (%)	31	19	7-60
Soil Depth (in)	39	12	20-50+
Total BA (ft^2)	263	81	160-400

GENERAL DESCRIPTION

All types of parent rock, positions, and topography. Litter is 88%, moss is 19%, rock is 3%, and bareground is 2%.

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	32	33	Seral to minor climax
Douglas-fir (PSME)	62	100	Seral
Tree Understory			
Port-Orford-cedar (CHLA)	10	100	Good growth
tanoak (LIDE3)	49	100	Climax
Douglas-fir (PSME)	8	80	Excellent growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	7	67	On better sites
salal (GASH)	55	93	On better LIDE3 sites
Pacific rhododendron (RHMA)	30	67	On good LIDE3 sites
evergreen huckleberry (VAOV2)	28	60	Often on moist soils
sword-fern (POMU)	3	53	On more moist sites

DISCUSSION: Port-Orford-cedar is an indication of high moisture availability where it is not on imbalanced, ultrabasic soils. Port-Orford-cedar is certainly appropriate for use here although *Phytophthera* risk is high. As with all tanoak associations, vegetation management and stocking level control are key considerations.

TANOAK/CALIFORNIA COFFEEBERRY
LIDE3/RHCA N = 7

EXTENT: Chetco, Illinois Valley, Powers, and possibly Gold Beach and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2353	722	1040-3460
Aspect (deg)	164	72	Mostly S
Slope (%)	21	21	3-65
Soil Depth (in)	30	14	10-50+
Total BA (ft^2)	69	26	40-100

GENERAL DESCRIPTION

Ultrabasic parent rock; on flat lower slope positions. Litter is low at 64%, moss extremely low at 6%, rock is high at 34%, and bareground is high at 10%.

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Port-Orford-cedar (CHLA)	15	43	Seral to minor climax
knobcone pine (PIAT)	10	71	Seral
lodgepole pine (PICO)	14	57	Seral
western white pine (PIMO)	15	57	Seral to minor climax
Douglas-fir (PSME)	12	57	Seral
Tree Understory			
tanoak (LIDE3)	27	100	Climax dominant
Douglas-fir (PSME)	4	100	Fair growth
huckleberry oak (QUVA)	20	71	Indicates hotter sites
California laurel (UMCA)	7	71	Indicates wetter sites
Shrub, Herb & Grass			
California coffeeberry (RHCA)	14	100	Indicates soil imbalance
red huckleberry (VAPA)	5	86	Sometimes indicates surface moisture
beargrass (XETE)	8	86	Indicates poorer sites

DISCUSSION: The LIDE3/RHCA Association is the ultrabasic version of a tanoak climax. Productivity is low, diversity is high, and aspects are decidedly south. Ungulate usage during winter, however, is limited by low forage and herbage production. The diverse vertical structure may attract birds. A wide variety of trees occur in the overstory of which any combination can be used for reforestation.

TANOAK/SALAL - PACIFIC RHODODENDRON
LIDE3/GASH-RHMA N = 10

EXTENT: Possibly all Districts of the Siskiyou National Forest; particularly Illinois Valley.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3160	388	2470-3640
Aspect (deg)	·350	60	Mostly N
Slope (%)	35	15	17-60
Soil Depth (in)	36	12	18-50+
Total BA (ft^2)	314	79	160-480

GENERAL DESCRIPTION

Metasediments and granitics on all positions and topography. Litter is very low at 46%, rock is 4%, moss and bareground cover is about normal at 23% and 3% respectively.

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	15	70	Seral
Douglas-fir (PSME)	57	100	Seral
Tree Understory			
golden chinquapin (CACH)	26	80	Seral on poorer sites
tanoak (LIDE3)	26	100	Climax
sugar pine (PILA)	8	50	Excellent growth
Douglas-fir (PSME)	3	80	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	18	100	On better sites
salal (GASH)	64	90	On better LIDE3 sites
Pacific rhododendron (RHMA)	34	90	Occurs on soils averaging 40" deep
red huckleberry (VAPA)	5	70	On wetter LIDE3 sites
vanillaleaf (ACTR)	3	70	Often on soils with surface moisture
western twinflower (LIBOL)	17	70	On warm, wet surfaces

DISCUSSION: This Association represents a transition from coastal to inland conditions where golden chinquapin (*Castanopsis chrysophyla*), sugar pine, prince's-pine (*Chimaphylla umbellata*), and vanillaleaf (*Achlys triphylla*) are indicative of the variable inland climate.

Although it commonly occurs east of the Coastal Crest, this Association is on relatively mild sites. It is highly productive, averaging 314 feet^2 of basal area. Stocking levels can be maintained at higher than average densities with impressive radial growth. Moisture is more limiting here than on the more coastal associations, subsequently vegetation management becomes more important if maintaining maximum production is the objective.

TANOAK/SALAL - DWARF OREGONGRAPE
LIDE3/GASH-BENE N = 17

EXTENT: Mostly the Illinois Valley and Galice Districts, possibly the coastal Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2565	576	1330-3400
Aspect (deg)	49	63	Mostly East
Slope (%)	33	23	7-82
Soil Depth (in)	41	13	20-50+
Total BA (ft^2)	259	80	110-440

GENERAL DESCRIPTION

Metasediments, metavolcanics, and igneous intrusive rocks on all types of topography and slope position. High moss cover (31%), low rock (3%), litter (78%), and bareground (19%).

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	11	71	Seral
Douglas-fir (PSME)	54	100	Seral
Tree Understory			
golden chinquapin (CACH)	27	59	Seral on poorer sites
Port-Orford-cedar (CHLA)	5	24	Occasional seral species
tanoak (LIDE3)	48	100	Climax
sugar pine (PILA)	5	53	Excellent growth
Douglas-fir (PSME)	10	88	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	16	94	On good sites
salal (GASH)	41	100	On better LIDE3 sites
baldhip rose (ROGY)	4	76	Ubiquitous
trailing blackberry (RUUR)	2	59	Ubiquitous
Oregon fairy-bell (DIHO)	1	59	Fair surface moisture
bracken (PTAQ)	4	76	Common
western twinflower (LIBOL)	10	41	Common

DISCUSSION: This is a typical, productive, usually inland, tanoak association. Soils are deep and fertile. Golden chinquapin is indicative of the drier sites; Port-Orford-cedar is indicative of moister sites. Sugar pine, Douglas-fir, incense-cedar, and Port-

Orford-cedar are all appropriate for regeneration efforts. Early brush control is essential to maximize crop tree growth.

Most inland tanoak sites have been repeatedly disturbed. Fire suppression has increased tanoak cover and reduced the repeated duff consumption and nutrient volatilization caused by intense fire. Many tanoak sites appear hot and dry with heavy Pacific madrone cover, but their potential productivity is masked. Without wildfire, madrone cover will decrease and organic material will slowly accumulate. Tanoak sites are generally some of the most productive sites in southwestern Oregon.

TANOAK - VINE MAPLE
LIDE3-ACCI N = 8

EXTENT: Mostly Illinois Valley, less so on Galice and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2650	764	1690-3550
Aspect (deg)	73	100	All
Slope (%)	39	23	0-70
Soil Depth (in)	38	12	20-50+
Total BA (ft^2)	348	141	140-560

GENERAL DESCRIPTION

All types of parent rock, particularly metasediment, metavolcanics, and granodiorite. Occurs mostly midslope to ridgetop on all types of topography. Moss cover is very high at 43%, litter is low at 78%. Bareground and rock are 1% and 4% respectively.

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	59	100	Seral
Tree Understory			
vine maple (ACCI)	20	100	Cool or moist sites
golden chinquapin (CACH)	4	63	Shallow soil indicator
tanoak (LIDE3)	39	100	Climax dominant
Douglas-fir (PSME)	4	63	Good growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	11	88	On the better sites
baldhip rose (ROGY)	3	75	Ubiquitous
vanillaleaf (ACTR)	5	63	Often on better sites
sword-fern (POMU)	4	100	Often on better sites

DISCUSSION: As indicated by high moss cover and the presence of vanillaleaf, Pacific yew (*Taxus brevifolia*), and sword-fern; sites in this Association are moist. Timber productivity is high; reforestation is usually not a problem, but site preparation or early control of vine maple (*Acer circinatum*) and tanoak is necessary. Most inland conifers including ponderosa pine will perform well. Sites with Pacific yew are often used by deer. Beds are commonly found under Pacific yew trees (thermal cover) and vine maple (hiding cover) is sometimes browsed. The acorns of tanoak are also an important food for deer.

TANOAK - WHITE FIR - VINE MAPLE
LIDE3-ABCO-ACCI N = 11

EXTENT: Mostly Illinois Valley, some on Galice, and possibly on Gold Beach District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3617	367	3250-4550
Aspect (deg)	355	93	All
Slope (%)	41	7	30-50
Soil Depth (in)	47	17	24-72
Total BA (ft²)	362	123	180-560

GENERAL DESCRIPTION

Metamorphosed materials, mostly on midslope positions in concavities. Litter is 97%, moss is 30%, bareground is 4%, and rock is 8%.

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	6	64	Seral
Douglas-fir (PSME)	70	100	Seral
Tree Understory			
white fir (ABCO)	14	100	Seral to minor climax
vine maple (ACCI)	7	100	Cool to moist sites
tanoak (LIDE3)	47	100	Climax
canyon live oak (QUCH)	5	91	Drier or disturbed sites
Shrub, Herb & Grass			
vanillaleaf (ACTR)	7	45	Occurs on soils averaging 38" deep
western twinflower (LIBOL)	7	45	On warm moist soils

DISCUSSION: White fir (Abies concolor), Douglas-fir, sugar pine, incense-cedar, Port-Orford-cedar, and ponderosa pine could be used for reforestation in this Association. It is slightly warmer than the LIDE3/ACCI Association. Repeated disturbance by fire was quite common. Most sites are still recovering from light, repeated underburns. It may look ragged, because of its fire history, but the LIDE3-ABCO-ACCI Association is one of the most productive associations in the Siskiyous. Soils are deep and loamy with very little rock. Vegetation management is the major silvicultural problem; therefore, stocking level control, both precommercial and commercial, will result in increased yields.

TANOAK - WHITE FIR
LIDE3-ABCO N = 19

EXTENT: Mostly Illinois Valley, some on Galice and possibly on Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3223	644	2140-4220
Aspect (deg)	313	100	All
Slope (%)	37	16	5-60
Soil Depth (in)	32	13	1-51
Total BA (ft^2)	305	102	120-480

GENERAL DESCRIPTION

Metamorphosed materials; from midslopes to ridgetops on all types of topography. All surface features are close to the Series averages. Litter is 87%, moss is 26%, bareground is 4%, and rock is 5%.

VEGETATION: (See page 188 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	11	58	Seral, good growth
Douglas-fir (PSME)	58	100	Seral
Tree Understory			
white fir (ABCO)	5	100	Seral to minor climax
golden chinquapin (CACH)	8	63	Shallow soil indicator
tanoak (LIDE3)	35	100	Climax
Douglas-fir (PSME)	4	74	Excellent growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	10	84	On good soils
baldhip rose (ROGY)	2	63	Ubiquitous
creeping snowberry (SYMO)	2	53	On poorer sites
vanillaleaf (ACTR)	8	53	Often on good soils
Oregon fairy-bell (DIHO)	1	58	On the moister sites
sword-fern (POMU)	2	68	On the moister sites

DISCUSSION: This is one of the most common associations on the Illinois Valley Ranger District. Environmentally it is a "middle-of-the-road" site. A variety of species will perform well, including Port-Orford-cedar if it is planted on sites with Oregon fairy-bell (*Disporum hookeri oreganum*) and sword-fern (*Polystichum munitum*). Douglas-fir, on most

sites, will produce the most biomass. White fir used in mixture will maximize the sites growth potential. If white fir is used, care must be taken during commercial thinning to avoid logging damage because of its susceptibility to rot. If it is damaged early in the rotation, defect will be high at harvest.

TANOAK/DWARF OREGONGRAPE
LIDE3/BENE N = 23

EXTENT: Galice and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3047	455	2020-3820
Aspect (deg)	7	104	All
Slope (%)	50	14	15-80
Soil Depth (in)	40	12	12-50+
Total BA (ft^2)	322	117	160-560

GENERAL DESCRIPTION

All types of parent materials including ultrabasics on all slope positions and topography. Litter is 88%, moss is 22%, bareground is 2%, and rock is 6%.

VEGETATION: (See page 195 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	60	100	Seral
Tree Understory			
tanoak (LIDE3)	39	100	Climax
sugar pine (PILA)	4	35	Excellent growth
Douglas-fir (PSME)	10	83	Excellent growth
canyon live oak (QUCH)	8	74	Disturbed or drier sites
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	21	65	On better sites and soils
baldhip rose (ROGY)	2	83	Ubiquitous
vanillaleaf (ACTR)	10	61	Average elevation 3750'

DISCUSSION: This Association is slightly warmer (both air and soil) than the LIDE3/ABCO Association. Soil temperatures in the Spring are probably not low enough to limit Douglas-fir growth and not high enough to damage seedlings. Timber productivity is high. Most sites can sustain high tree densities early in the rotation, which will keep out brush competition. Once the trees are free to grow, stocking level control is essential. Reforestation on southerly aspects may require extra measures such as microsite planting, but reforestation in general should not be difficult.

TANOAK/DWARF OREGONGRAPE - POISON OAK
LIDE3/BENE-RHDI   N = 7

EXTENT: Illinois Valley and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2589	333	2280-3260
Aspect (deg)	52	68	Mostly East
Slope (%)	54	19	33-88
Soil Depth (in)	31	11	15-50+
Total BA (ft²)	277	105	100-440

GENERAL DESCRIPTION

Igneous and metamorphosed materials, mostly on ridge-tops. Litter is 88%, moss is slightly low at 20%, bareground and rock are 4% and 2% respectively.

VEGETATION: (See page 195 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	3	71	Seral
Douglas-fir (PSME)	62	100	Seral
Tree Understory			
Pacific madrone (ARME)	13	86	Seral, disturbed sites
tanoak (LIDE3)	70	100	Climax
sugar pine (PILA)	3	57	Good growth
Douglas-fir (PSME)	9	86	Excellent growth
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	25	100	Better sites, good soils
poison oak (RHDI)	3	100	Hot, dry sites
baldhip rose (ROGY)	4	71	Occurs on soil 37" average
vanillaleaf (ACTR)	5	86	Occurs on slopes averaging 45%

DISCUSSION: The LIDE3/BENE-RHDI is so named, BENE modified by RHDI, because poison oak (*Rhus diversiloba*) is indicative of the hottest and most difficult sites to regenerate. When dwarf Oregongrape is associated with poison oak, site conditions for regeneration are much more favorable and productivity is higher. Notice that vanillaleaf cover is relatively high, and canyon live oak (*Quercus chrysolepis*) is generally absent. Both conditions indicate more favorable soil characteristics. This Association is one of four tanoak associations which we expect will have reforestation problems. In order of decreasing efficiency, appropriate species for regeneration are as follows: Douglas-fir, sugar pine, incense-cedar, and ponderosa pine.

TANOAK - CANYON LIVE OAK
LIDE3-QUCH N = 14

EXTENT: Illinois Valley and Galice District possibly Gold Beach.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2787	499	1360-3300
Aspect (deg)	330	74	All
Slope (%)	58	11	40-79
Soil Depth (in)	31	13	6-52
Total BA (ft²)	243	107	40-400

GENERAL DESCRIPTION

All types of parent material; on all types of topography and lower 1/3 to ridgetop positions. Litter is low at 78% and rock is high at 31%. Moss (24%) and bareground (5%) are about average for the Series.

VEGETATION: (See page 195 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	10	93	Seral
Douglas-fir (PSME)	48	100	Seral
Tree Understory			
Pacific madrone (ARME)	8	71	On soils averaging 36" deep
tanoak (LIDE3)	28	100	Climax
sugar pine (PILA)	3	71	Fair growth
Douglas-fir (PSME)	9	79	Good growth
canyon live oak (QUCH)	23	93	On soils averaging 34" deep
Shrub, Herb & Grass			
poison oak (RHDI)	12	100	Hot sites
whipplevine (WHMO)	6	71	Warmer soils
vanillaleaf (ACTR)	3	71	Good-fair surface soils
white-flowered hawkweed (HIAL)	2	57	Common on warm sites
western starflower (TRLA2)	2	79	Disturbed ground

DISCUSSION: This Association is one of the four hot-dry tanoak associations. It has the steepest slopes of the Series with high surface rock cover and shallow soils. Poison oak and whipplevine (Whipplea modesta) indicate a warm hot, dry environment. Reforestation may be difficult because moisture becomes limiting early in the growing season. Prescriptions

should be tailored to conserve moisture and reduce radiation load. Site preparation can be used to reduce the competition for moisture. Microsite planting can also aid survival. Areas with dead shade and deep soils would be preferred spots. Vanillaleaf will indicate the better planting spots if the site was not burned. Burning will also tend to make reforestation more difficult by darkening the soil surface color and magnifying temperature extremes. In addition, the mulch-like duff is often consumed, increasing the rate of moisture loss. Douglas-fir, ponderosa pine, incense-cedar, and sugar pine are all appropriate for regeneration in this Association.

TANOAK - CANYON LIVE OAK/DWARF OREGONGRAPE
LIDE3-QUCH/BENE N = 8

EXTENT: Galice and Illinois Valley Districts, possibly Gold Beach.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2551	439	1920-3220
Aspect (deg)	55	75	Mostly East
Slope (%)	52	13	30-70
Soil Depth (in)	30	13	15-50
Total BA (ft^2)	255	66	140-360

GENERAL DESCRIPTION

All types of topography, position, and parent rock. Rock is high (15%) with other surface variables about average for the Series.

VEGETATION: (See page 195 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
sugar pine (PILA)	11	88	Seral
Douglas-fir (PSME)	57	100	Seral
Tree Understory			
Pacific madrone (ARME)	15	88	Seral, on disturbed sites
tanoak (LIDE3)	44	100	Climax
Douglas-fir (PSME)	15	63	Good growth
canyon live oak (QUCH)	11	100	Hotter, drier sites
sugar pine (PILA)	2	63	Good sites
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	15	100	Good sites
hairy honeysuckle (LOHI)	4	100	Hot sites
poison oak (RHDI)	10	100	Dry sites
whipplevine (WHMO)	13	50	Warmer soils
baldhip rose (ROGY)	2	88	Slight tendency for hotter sites

DISCUSSION: Although this is one of the four hot-dry tanoak associations, the presence of dwarf Oregongrape averaging 15% cover indicates significantly better environmental conditions for survival and growth than the hottest, driest association of the Tanoak Series: the LIDE3/RHDI-LOHI Association. Soils are shallow and rock content is high. Reforestation

will be difficult, particularly in areas where canyon live oak cover is over 20%. Both Douglas-fir and ponderosa pine will perform well, once established. Incense-cedar will have a high survival rate but a slow growth rate. Sugar pine will survive in the more mesic sites, and once established, will perform well. Site preparation and vegetation management to reduce competition for soil moisture is important. Water is the most limiting factor on these sites.

TANOAK/POISON OAK - HAIRY HONEYSUCKLE
LIDE3/RHDI-LOHI N = 16

EXTENT: Galice and Illinois Valley Districts; some on Gold Beach.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2093	711	320-3200
Aspect (deg)	309	112	All
Slope (%)	50	18	17-75
Soil Depth (in)	32	12	10-50+
Total BA (ft^2)	231	93	80-380

GENERAL DESCRIPTION

Occurs on conglomerate, granitics and all other types of materials. Mostly on convex slopes from the lower 1/3 to the ridgetops. Litter is low at 71% and rock is high at 21%. Bareground and moss are slightly high at 6% and 33% respectively.

VEGETATION: (See page 195 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	53	100	Seral
Tree Understory			
Pacific madrone (ARME)	10	88	Disturbed sites
tanoak (LIDE3)	38	100	Climax
Douglas-fir (PSME)	12	81	Fair growth
canyon live oak (QUCH)	25	94	Hotter sites
Shrub, Herb & Grass			
hairy honeysuckle (LOHI)	5	94	Hottest sites with RHDI
poison oak (RHDI)	14	100	Hottest sites with LOHI
whipplevine (WHMO)	4	75	Warm soils

DISCUSSION: This is the hottest, driest association of the Tanoak Series. Both canyon live oak and California black oak (Quercus kelloggii) indicate moisture stress problems. As their absolute cover increases, the difficulty in establishing regeneration increases. Oceanspray (Holodiscus discolor) is another strong indicator of dry sites when its cover is greater than 15 percent. All of the problems associated with the other three hot-dry tanoak associations are more critical here. Soils are shallow, surface rock is high, and the amount of bareground unprotected by litter is high for the Series.

Although this Association is the hottest and driest of the Tanoak Series, it is not nearly as extreme as the hottest in the Douglas-fir Series. It is capable of producing good stands of timber and a significant amount of fuel. Because of its productivity and the warm, dry environment, it has been repeatedly burned. As these sites are managed to exclude destructive fires and enhance the amount of organic material in the soil, their true productive potential can be realized.

TABLE 11: CONSTANCY TABLE FOR COAST REDWOOD ASSOCIATIONS

LIDE3-SESE2

Number of Samples	6	
	Cons[1/] (%)	Mean[2/] (%)
ENVIRONMENT:		
ELEV	100	1130
ASPECT	100	310
SLOPE	100	28
TODPTH	100	42
TOTBA	100	260
TREE OVERSTORY:		
PSME	100	55
SESE2	83	31
LIDE3	17	15
TOTALO	100	83
TREE UNDERSTORY:		
LIDE3	100	48
TSHE	50	21
PSME	50	3
SESE2	33	24
UMCA	33	11
ALRU	17	33
ARME	17	5
TOTALU	100	77

TABLE 11 (Cont): CONSTANCY TABLE FOR COAST REDWOOD ASSOCIATIONS

LIDE3-SESE2

Number of Samples	6	
	Cons	Mean
SHRUBS:		
VAOV2	100	57
RHMA	67	22
VAPA	67	4
GASH	50	17
BENE	33	5
CONU	17	10
RHPU	17	5
RUUR	17	1
TOTALS	100	87
HERBS:		
POMU	83	22
VIOR2	83	1
TROV	67	2
OXOR	50	2
PTAQ	50	2
MOSI	33	2
TRLA2	33	2
GAAP	33	1
ADBI	17	1
DIHOO	17	1
DISM	17	1
GOOB	17	1
HIAL	17	1
TOTALH	100	25

TABLE 11 (Cont): CONSTANCY TABLE FOR COAST REDWOOD ASSOCIATIONS

LIDE3-SESE2

	LIDE3-SESE2	
Number of Samples	6	
	Cons	Mean
GRASSES:		
FEOC	17	1
FESTU	17	1
LUPA	17	1
TOTALG	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

TABLE 12: CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
ENVIRONMENT:														
ELEV	100	2043	100	1220	100	1174	100	1240	100	1882	100	2809	100	2477
ASPECT	100	40	100	157	100	305	100	344	100	14	100	30	100	345
SLOPE	100	31	100	38	100	47	100	44	100	34	100	28	100	43
TODPTH	100	44	100	46	100	43	100	45	100	43	100	33	100	41
TOTBA	100	207	100	224	100	243	100	254	100	203	100	267	100	267
TREE OVERSTORY:														
PSME	100	75	100	65	100	60	100	45	100	56	100	71	100	75
PILA	17	18	10	10					19	24	21	10	7	10
LIDE3	17	12	20	43	17	29	14	35	19	31			7	5
PIAT							14	10	5	2				
CHLA														
PIPO														
PIMO														
PICO														
PIJE														
CADE3														
ABCO														
TOTALO	100	80	100	75	100	65	100	51	100	67	100	74	100	76
TREE UNDERSTORY:														
LIDE3	100	64	100	85	96	63	100	89	100	72	100	36	100	73
PSME	50	3	40	2	46	3	29	1	76	4	71	7	79	15
QUCH	33	16	20	14	25	7			5	3	29	3	57	17
PILA	17	4	10	2					14	1	7	1	14	2
CACH	17	7							24	16	36	37	14	13
ARME			40	9	33	12	43	9	38	15	21	18	29	11
ACMA			20	21	33	10	14	12			7	12		
ALRU			10	15	17	28	14	4			7	30		
ABCO			10	3										
TABR					4	5			5	1	14	5		
ACCI					13	17					14	16		
UMCA					100	22								
PIMO											7	3		
QUSA											14	18		
CHLA														

TABLE 12 (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
PIPO														
CADE3														
QUVA														
PIAT														
PICO														
QUKE														
TOTALU	100	73	100	98	100	100	100	96	100	85	100	67	100	100
SHRUBS:														
BENE	50	29	10	30	38	3	43	8	76	20	71	17	50	10
VAOV2	100	36	100	52	79	46	100	55	100	27				
ROGY	33	4	30	1	13	2			10	3	14	3	29	3
WIMO	33	1	10	2	25	32			5	1	14	2	21	3
COCOC	17	4	20	2	8	9								
RUUR	17	1			21	2	14	1	19	3	21	1	36	2
GASH	100	18			8	9			100	31	100	52	64	40
CONU	33	4			29	4					7	1	7	2
RUPA	17	3			4	20								
BEPI	17	3											14	3
CIME			10	1	8	1	14	1	33	1	14	1	7	1
LOHI			20	2	8	3	14	1					14	2
VAPA					4	3	14	3	10	3	21	2	7	1
RIMA					46	20	100	43	100	41	100	48		
SYMO					4	5			5	1			29	2
RHDI					8	2			14	1				
HODI					4	1					14	8		
LOCI					4	2								
RHPU					8	1								
RUSP					4	20								
CETH					4	5								
SAAR5					4	1								
CHUM									10	2	29	5	21	10
BEPU									5	2				
BEAQ													7	10

TABLE 12 (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):														
ARNE														
JUCO4														
RHCA														
ARPA														
ARVI														
GABU														
RHOC														
CEPR														
ROSA														
PAMY														
GAOV														
VAME														
LONIC														
SYAL														
AMPA														
RISA														
CEVE														
GAFR														
RILA														
RICR														
ARCO3														
CEIN														
TOTALS	100	73	100	57	100	61	100	102	100	116	100	115	100	37
HERBS:														
DISM	17	1	10	1	33	1	43	1	19	2	14	1	29	1
VIOR2	67	1	20	1	25	1	57	1	10	1	7	1	21	2
POMU	67	2	60	4	79	10	57	2	38	8	29	4	64	2
GOOB	50	1	30	1	25	1	14	1	48	1	50	1	50	1
XETE	67	4	10	1	17	2	57	9	57	6	71	8	36	8
PTAQ	33	1	10	2	46	2	43	1	62	3	57	2	43	2
OXOR	17	1	20	2	8	41	14	1			7	1		
PTAN	17	1	10	1	4	1								
VACH	33	2	10	1			14	1	10	2			7	30
COMA3	17	1			8	1	29	1	5	1	7	1	21	1

TABLE 12 (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
TRLA2	17	1			21	2			5	1	7	1	7	1
PYAS	17	1			4	1			5	1	7	1	14	1
TROV	17	1			8	1			5	3	14	1		
HIAL	17	1			17	2							29	2
OXSU	17	5			8	17							7	3
COME	17	1			4	1								
CASC2	17	1									7	1	14	1
SYRE	17	2											21	1
GAOR	17	1												
DIHOO			20	1	8	2			5	1	14	1	7	1
GAAP			10	1	21	1					7	3	7	1
ADBI			30	1	13	3					7	1	21	5
GATR			20	1	13	12							21	7
PYPI			20	1					14	1	21	1	21	2
VAHE			10	1					5	1	14	1	14	2
SASA2			10	1									14	1
HECO			20	1									7	1
IRTEK			20	1									7	1
HYNO			10	1									7	1
CAPU					13	2	14	1	5	1			7	1
POHE2					8	1	14	1			7	1		
ACTR					8	1			10	4	21	1	7	1
LICA3					4	1					7	1	14	1
BLSP					4	5							7	1
SAXIF					4	2								
BOST2					4	1								
WOODW					4	2								
SMRA					4	1								
MOPA					4	5								
LOCR					4	2								
ATFI					4	1								
BOEL					4	1								
DIFO					4	1								
GAAM							14	1						
ALVI							14	1						

TABLE I2 (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
COST2									5	1	7	1	21	1
IRCH									5	1				
LIBOL									5	5				
LICO3									5	1				
SMST									5	1				
CIAL									5	1				
AQFO									5	1				
PYDE											7	1	14	1
MOSI											7	1		
LIWA											7	1		
MOHY											7	1		
COHE													7	1
EQAR													7	1
APAN													7	1
MAMA													21	1
COMPO													7	1
ARNIC													7	1
POLYP													7	1
ASHA														
ERAU														
COLA														
MIMUL														
STME2														
TRRI														
POCA8														
ARCO														
LUPIN														
ASBR														
ERHE2														
LOMAT														
VIAM														
ASDE														
HAUN														
COPO														
BRODI														

TABLE 12 (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
ERPYC														
ACMI														
EPRI														
GENTI														
HOSE														
LIBO3														
LOMA2														
LOTR														
MOOD														
SELI														
VICU														
ANDE														
VECA														
VIOLA														
PHAD														
PSPH														
MOPE														
CABU2														
VIGL														
ASCA3														
HEMI														
CLUN														
ARLA														
CYGR														
PYSE														
FRVEB														
ERAL														
ANLY2														
ARMA3														
ERGR														
PENST														
ERHO2														
CAPR3														
LATHY														
NEHE														

TABLE 12 (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3/VAOV2-GASH		LIDE3/VAOV2		LIDE3-UMCA		LIDE3/RHMA		LIDE3/RHMA-VAOV2		LIDE3/RHMA-GASH		LIDE3/GASH	
Number of Samples	6		10		24		7		21		14		14	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
EPMI														
LAPO														
COGR														
SEPU2														
OSCH														
TOTALH	100	9	100	6	100	20	100	9	100	11	100	11	100	15
GRASSES:														
FEOC	17	1	10	1	4	1			5	1	14	1	21	1
FESTU	17	1					14	1					14	1
POA			10	1	4	2								
FESU					13	2							7	2
CAREX					4	1								
BROMU					8	3								
LUPA					4	1								
FERU											7	1	7	1
PHPR														
FEID														
ELGL														
CYEC														
TOTALG	100	T	100	T	100	1	100	T	100	T	100	T	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

TABLE 12a: CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
ENVIRONMENT:														
ELEV	100	2160	100	2353	100	3160	100	2565	100	2650	100	3617	100	3223
ASPECT	100	348	100	164	100	350	100	49	100	73	100	355	100	313
SLOPE	100	31	100	21	100	35	100	33	100	39	100	41	100	37
TOOPTH	100	39	100	30	100	36	100	41	100	39	91	47	100	34
TOTBA	100	263	100	69	100	314	100	259	100	348	100	362	100	305
TREE OVERSTORY:														
PSME	100	62	57	12	100	57	100	54	100	59	100	70	100	58
PILA	20	10	14	30	70	15	71	11	38	6	64	6	58	11
LIDE3	7	12					6	3						
PIAT			71	10			6	5						
CHLA	33	32	43	15	10	4	18	25	13	50			5	1
PIPO	7	15					18	10			9	1	21	4
PIMO			57	15										
PICO			57	14										
PIJE			29	6										
CADE3							6	15	13	5	9	8	5	20
ABCO											20	7	26	12
TOTALO	100	76	100	43	100	69	100	69	100	69	100	76	100	69
TREE UNDERSTORY:														
LIDE3	100	49	100	27	100	26	100	48	100	39	100	47	100	35
PSME	80	8	100	4	80	3	88	10	63	4	36	2	74	4
QUCH			14	40	20	3	35	6	63	3	91	5	68	10
PILA	20	4	14	3	50	8	53	5	13	1	27	1	37	2
CACH	20	17			80	26	59	27	63	4	27	3	63	8
ARME	40	9	14	1	40	3	47	20	38	3	55	4	47	13
ACMA	7	30					12	5	50	15	27	2		
ALRU	7	30					6	10	13	20	9	1		
ABCO					30	6					100	14	100	5
TABR	7	1			30	1	18	7	50	18	9	1	26	2
ACCI	7	30			10	3			100	20	100	7		
UMCA	20	4	71	7										
PIMO			57	14	10	1								
QUSA					40	24	6	7					5	8
CHLA	100	10	43	1			24	5	13	8	9	3	11	3

TABLE 12a (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
PIPO	7	5												
CADE3			14	20			12	12	13	1	27	7	26	2
QUVA			71	20	20	9								
PIAT			57	6										
PICO			43	10										
QUKE							6	10	13	1				
TOTALU	100	79	100	75	100	68	100	92	100	88	100	80	100	64
SHRUBS:														
BENE	67	7			100	18	94	16	88	11	91	8	84	10
VAOV2	60	28	14	5	20	5	24	13					5	8
ROGY	27	2	29	1	70	4	76	4	75	3	73	4	63	2
WHMO			29	11	40	1	24	2	63	5	82	5	58	5
COCOC							18	5	38	24	55	3	16	2
RUUR	33	1			40	1	59	2	50	1	9	1	21	3
GASH	93	55			90	64	100	41	38	43				
CONU	13	9			60	4	41	11	63	7	27	4	11	3
RUPA							6	1	13	0			5	1
BEPI							6	1			9	8	16	4
CHME	13	1	14	1	50	1	47	1	25	1	82	1	58	1
LOHI							24	1	13	1	9	1	11	1
VAPA	7	2	86	5	70	5	24	7	50	2	27	4	32	4
RHMA	67	30	14	2	90	34					9	60	11	12
SYMO	7	1			50	2	29	1	25	3	55	3	53	2
RHDI	13	2	14	1			29	4	25	3			11	3
HODI	7	10	14	6					13	2	9	8	26	2
LOCI					20	0	12	2			9	1	5	3
RHPU									13	1				
RUSP														
CETH														
SAAR5														
CHUM	20	1			90	3	41	4	38	2	55	4	68	6
BEPU			43	1										
BEAQ											27	1		

TABLE 12a (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):														
ARNE			57	9	10	5							5	2
JUCO4			57	5	10	2								
RHCA			100	14			12	12					5	1
ARPA			14	4										
ARVI			29	16										
GABU			57	6										
RHOC			29	22										
ROSA			29	1										
PAMY					10	1					18	1		
CEPR			29	2										
GAOV					10	5							5	2
VAME					10	10								
LONIC					10	1								
SYAL							6	3			9	8	5	3
AMPA									13	1	9	1	5	1
RISA											9	1		
CEVE											9	0		
GAFR													5	3
RILA														
RICR														
ARCO3														
CEIN														
TOTALS	100	96	100	47	100	122	100	77	100	48	100	29	100	25
HERBS:														
DISM	7	1												
VIOR2	33	1			40	1	24	1	38	1	27	1	32	1
POMU	53	3	14	2	20	2	65	2	100	4	55	2	68	2
GOOB	53	1	14	1	70	1	71	1	88	1	91	1	84	2
XETE	20	2	86	8	30	5	24	4			9	5	16	15
PTAQ	20	2			50	2	76	4	38	2			32	3
OXOR	7	1					6	5					11	6
PTAN														
VACH	33	1	14	10					13	4				
COMA3	7	1			10	1			13	1	9	1	26	1

TABLE 12a (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
TRLA2			86	2	20	1	18	4	63	1	45	1	37	1
PYAS					10	1	6	3	13	1	9	1		
TROV	27	1			40	1	12	2	25	1	18	1	11	1
HIAL	7	1			20	2	6	1	25	1	36	2	32	1
OXSU	13	2							13	3				
COME														
CASC2					20	2	6	1			18	3	11	1
SYRE					20	1	12	1			55	4	26	1
GAOR	7	2												
DIHO0	27	1	29	1	40	2	59	1	50	2	55	1	58	1
GAAP	7	3			10	2	18	2	25	2	27	1	5	1
ADBI					10	1	24	2	63	2	18	1	21	2
GATR														
PYPI	27	1			30	1	18	1	25	1	45	1	21	2
VAHE					10	5	24	1	13	2	27	1	5	3
SASA2					10	1	6	1	13	1				
HECO														
IRTEK														
HYMO														
CAPU											27	1		
POHE2					10	1	6	1			18	1		
ACTR	13	2			70	3	35	15	63	5	45	7	53	8
LICA3	13	1												
BLSP														
SAXIF	7	2												
BOST2							12	1			9	1	5	1
WOODW							6	1						
SMRA									25	2			5	1
MOPA														
LOCR														
ATFI														
BOEL														
DIFO														
GAAM			43	2			6	1						
ALVI														

TABLE 12a (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
COST2							6	1						
IRCH			57	1	40	1	6	3	13	1	9	1	37	1
LIBOL	13	2			70	17	41	10	50	9	45	7	42	9
LICO3					20	1					18	1	11	1
SMST									13	3				
CIAL									13	2				
AQFO														
PYDE			14	1	30	1	18	1					5	1
MOSI									13	1				
LIWA														
MOHY														
COHE	7	1											5	1
EQAR							6	1						
APAN													21	2
MAMA														
COMPO														
ARNIC														
POLYP														
ASHA	7	1					6	3	25	1	55	1	11	1
EBAU	13	1					6	1	13	1				
COLA	7	1												
MIMUL	7	1												
STME2	7	1												
TRRI	7	1												
POCA8			14	1	10	1	6	1						
ARCO			14	1	10	1			·13	3	18	1	5	1
LUPIN			14	2	10	1								
ASBR			14	1			6	1						
ERHE2			14	1			6	1						
LOMAT			14	1			6	1						
VIAM			14	1							9	1	5	8
ASDE			29	2							9	0		
HAUN			14	1										
COPO			14	1										
BRODI			29	1										

TABLE 12a (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
ERPYC			14	2										
ACMI			14	1										
EPRI			14	1										
GENTI			14	1										
HOSE			14	1										
LIBO3			14	1										
LOMA2			14	1										
LOTR			14	1										
MOOD			14	1										
SELI			14	1										
VICU			14	1										
ANOE					10	1	6	1	25	2	18	1		
VECA					10	1	6	1			27	1		
VIOLA					20	2	12	2					5	1
PHAD					20	0			25	1	18	1	11	1
PSPH					10	3							5	3
MOPE							6	1						
CABU2									25	1	27	1	16	1
VIGL									13	1	9	1	5	1
ASCA3									13	2				
HEMI									13	2				
CLUN									13	5				
ARLA											9	1	11	2
CYGR											9	1	5	1
PYSE											9	1		
FRVEB											9	1		
ERAL											9	1		
ANLY2											9	1		
ARMA3													5	1
ERGR													5	1
PENST													5	1
ERHO2													5	1
CAPR3														
LATHY														
NEHE														

TABLE 12a (Cont): CONSTANCY TABLE FOR TANOAK ASSOCIATIONS

	LIDE3-CHLA		LIDE3/RHCA		LIDE3/CASH-RHMA		LIDE3/GASH-BENE		LIDE3-ACCI		LIDE3-ABCO-ACCI		LIDE3-ABCO	
Number of Samples	15		7		10		17		8		11		19	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
EPMI														
LAPO														
COGR														
SEPU2														
OSCH														
TOTALH	100	7	100	16	100	24	100	20	100	23	100	18	100	20
GRASSES:														
FEOC	7	2							13	1				
FESTU	13	1									9	8	5	2
POA			14	1										
FESU	13	2			10	2	12	1	38	1	9	1	26	1
CAREX	13	2											5	1
BROMU									13	1				
LUPA														
FERU			14	1	10	1							11	1
PHPR	7	1												
FEID														
ELGL														
CYEC														
TOTALG	100	1	100	T	100	T	100	T	100	1	100	1	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

TABLE 12b: CONSTANCY TABLE FOR TANAOK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
ENVIRONMENT:										
ELEV	100	3047	100	2589	100	2787	100	2551	100	2093
ASPECT	100	7	100	52	100	330	100	55	100	309
SLOPE	100	50	100	54	100	58	100	52	100	50
TODPTH	100	40	100	31	100	31	100	30	100	32
TOTBA	100	322	100	277	100	243	100	255	100	231
TREE OVERSTORY:										
PSME	100	60	100	62	100	48	100	57	100	53
PILA	43	6	71	3	93	10	88	11	31	8
LIDE3			14	50						
PIAT										
CHLA	4	5							6	3
PIPO	17	17	29	5	14	7			19	5
PIMO										
PICO										
PIJE									6	3
CADE3	4	10	14	20	7	3	25	18	13	10
ABCO										
TOTALO	100	66	100	75	100	58	100	71	100	58
TREE UNDERSTORY:										
LIDE3	100	39	100	70	100	28	100	44	100	38
PSME	83	10	86	9	79	9	63	15	81	12
QUCH	74	8	29	42	93	23	100	11	94	25
PILA	35	4	57	3	71	3	63	2	44	3
CACH	48	14	29	6	36	16	25	4		
ARME	74	7	86	13	71	8	88	15	88	10
ACMA			14	3	7	17			19	10
ALRU										
ABCO					7	1				
TABR	22	4			14	1	25	4		
ACCI					7	3				
UMCA									6	25
PIMO	9	1								
QUSA	4	5								
CHLA									6	5

TABLE 12b (Cont): CONSTANCY TABLE FOR TANAOK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):										
PIPO	4	2							6	1
CADE3	17	6	14	3	21	6	25	10	31	4
QUVA	9	5								
PIAT										
PICO										
QUKE	4	1			14	2	25	5	31	5
TOTALU	100	69	100	105	100	74	100	85	100	88
SHRUBS:										
BENE	65	21	100	25	36	7	100	15	19	4
VAOV2										
RDGY	83	2	71	4	50	3	88	2	38	4
WHMO	48	4	43	5	71	6	50	13	75	4
CDCOC	26	5	29	6	29	4			25	7
RUUR	35	2	29	6	36	1	13	1	13	2
GASH									6	40
CONU	22	10	57	4	36	5	50	4	25	8
RUPA			29	1	7	1				
BEPI	4	1			21	2			13	5
CHME	43	1	57	1	43	1	25	2	19	2
LOHI	17	1					100	4	94	5
VAPA	17	4			21	2	13	3	6	1
RHMA										
SYMO	30	3	57	3	29	7	25	5	19	6
RHDI			100	3	100	12	100	10	100	14
HODI					7	12			6	25
LOCI	13	2	29	2	21	2			6	8
RHPU										
RUSP										
CETH										
SAAR5										
CHUM	52	4	71	11	50	3	13	3	25	2
BEPU					7	3				
BEAQ	4	8							6	1

TABLE 12b (Cont): CONSTANCY TABLE FOR TANAUK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):										
ARNE										
JUCO4										
RHCA					14	1				
ARPA					7	1				
ARVI									6	3
GABU										
RHOC										
CEPR										
ROSA										
PAMY			14	1						
GAOV										
VAME										
LONIC										
SYAL					7	8				
AMPA							13	1	13	3
RISA	4	1								
CEVE										
GAFR										
RILA					7	5				
RICR					7	1				
ARCO3									6	1
CEIN									6	1
TOTALS	100	27	100	48	100	32	100	41	100	36
HERBS:										
DISM										
VIOR2	22	1					13	1		
POMU	35	2	71	3	64	3	50	2	56	5
GOOB	83	2	57	2	57	1	25	1	44	1
XETE	4	1			7	3	13	1		
PTAQ	43	7	29	4	36	2	38	2	25	2
OXOR										
PTAN					7	1				
VACH										
COMA3	4	1	14	1					6	1

TABLE 12b (Cont): CONSTANCY TABLE FOR TANAOK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):										
TRLA2	35	2	14	8	79	2	38	2	19	1
PYAS			14	1			13	1		
TROV	9	1								
HIAL	26	3	14	1	57	2	38	3	44	3
OXSU										
COME										
CASC2	26	3			21	2				
SYRE	13	2			7	5	25	3	25	1
GAOR										
DIHOO	43	1	57	2	21	2	50	1	25	2
GAAP	9	1			36	1			6	1
ADBI	22	2	57	1	21	9	25	1	13	3
GATR										
PYPI	43	2	14	3	29	1			13	1
VAHE	4	1			7	1			6	1
SASA2							13	1		
HECO										
IRTEK										
HYMO										
CAPU					21	2	25	1	6	1
POHE2	4	1	29	1	7	1			6	1
ACTR	61	10	86	5	71	3	25	1	44	6
LICA3					7	1	13	1	6	1
BLSP										
SAXIF										
BOST2	9	1	14	1	14	1			6	1
WOODW										
SMRA							13	1	25	1
MOPA										
LOCR										
ATFI										
BOEL										
DIFO										
GAAM					14	1	25	1	6	1
ALVI	9	1			7	1			6	1

TABLE 12b (Cont): CONSTANCY TABLE FOR TANAOK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):										
COST2	9	1	14	1	7	1				
IRCH	9	1			29	2	38	1	25	1
LIBOL	26	9	14	20	43	6	25	43		
LICO3	4	0					13	1		
SMST			14	1						
CIAL										
AQFO										
PYDE	9	1	14	1	29	2	25	1		
MOSI	4	1	14	1	7	1				
LIWA										
MOHY										
COHE					14	1			25	1
EQAR										
APAN	9	1	29	2	36	1	13	1	13	1
MAMA					7	1	13	1	19	4
COMPO									6	5
ARNIC										
POLYP										
ASHA	17	2	29	2	29	2	13	1		
EBAU			14	1						
COLA										
MIMUL										
STME2										
TRRI										
POCA8									6	1
ARCO	4	1							6	1
LUPIN										
ASBR	4	1							6	1
ERHE2							13	2		
LOMAT										
VIAM					14	2			13	1
ASDE										
HAUN	4	1							6	1
COPO									6	1
BRODI										

TABLE 12b (Cont): CONSTANCY TABLE FOR TANAOK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):										
ERPYC										
ACMI										
EPRI										
GENTI										
HOSE										
LIBO3										
LOMA2										
LOTR										
MOOD										
SELI										
VICU										
ANDE	4	1								
VECA	4	3								
VIOLA	9	1			14	1				
PHAD	9	1	14	3	14	1				
PSPH										
MOPE					7	1				
CABU2	9	2			14	1				
VIGL	4	1								
ASCA3									6	1
HEMI									6	1
CLUN										
ARLA	4	1			14	1	13	1	6	1
CYGR	4	3					13	1	13	1
PYSE	4	0	14	1	7	0				
FRVEB	9	1			7	1				
ERAL	13	2								
ANLY2	9	1								
ARMA3	4	1			14	1			6	2
ERGR										
PENST										
ERHO2										
CAPR3	4	1					25	1	19	1
LATHY	4	1								
NEHE			14	1	14	1	13	1		

TABLE 12b (Cont): CONSTANCY TABLE FOR TANAOK ASSOCIATIONS

	LIDE3/BENE		LIDE3/BENE-RHDI		LIDE3-QUCH		LIDE3-QUCH/BENE		LIDE3/RHDI-LOHI	
Number of Samples	23		7		14		8		16	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):										
EPMI			14	1						
LAPO					7	8	13	65	6	2
COGR					7	1				
SEPU2					7	15				
OSCH							13	5	6	1
TOTALH	100	20	100	18	100	20	100	29	100	13
GRASSES:										
FEOC					7	1				
FESTU	4	1								
POA	4	2								
FESU	9	1			14	1	38	1	31	2
CAREX										
BROMU									19	2
LUPA										
FERU	4	1	14	1	14	2	25	1	13	1
PHPR										
FEID	4	T								
ELGL									13	5
CYEC									6	12
TOTALG	100	0	100	0	100	1	100	1	100	2

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

THE DOUGLAS-FIR SERIES

The Species

Douglas-fir (Pseudotsuga menziesii) is the most common tree species in southwest Oregon. It is a seral species in most cases, but in almost 20 percent of the samples in the Siskiyou Mountain Province, Douglas-fir is either the climax or coclimax species. It has few environmental limitations as indicated by its range of occurrence.

The Series

The Series ranges from 300 to 6000 feet in elevation, on all aspects, and on slopes exceeding 120 percent. Soil depths range from 6 to over 50 inches and basal area production is as high as 720 square feet.

Except for the Ponderosa Pine Series, which is keyed here and is rare on Forest Service administered lands in the Siskiyou Province, the Douglas-fir Series is the driest that supports commercial forest land. Even on the most moist sites within the Series, moisture is most often the limiting factor.

The Series can be broken into three groupings of associations with similar management problems. The coolest group of associations support white fir (Abies concolor). Tanoak (Lithocarpus densiflorus) occurs sporadically (11 percent) with low cover values. Tanoak, however, does not occur at high elevations, an indication of its lack of tolerance for cool temperatures. White fir, of course, does very well on cool sites. Thus, the Douglas-fir - white fir associations can be thought of as cool environmentally, although specific associations can be either dry or relatively moist.

There are no characteristically dominating silvicultural problems with the PSME-ABCO associations. Competition, animal damage, moisture stress, and physical barriers are all potential reforestation problems. The variety of environments span from cool to hot, with dry soils and high evaporative demand. Plant composition and structure is diverse allowing an impressive variety of fauna.

The group of Douglas-fir associations that support tanoak have a dominating silvicultural problem. As with the PSME-ABCO associations, animal damage, moisture stress, and physical limitations are still a problem; but the potential for competition from tanoak is extremely high. The environment differs from the previous group in that the temperatures are more moderate and atmospheric moisture is more plentiful. The atmospheric moisture reduces the vapor pressure gradient from leaf to atmosphere thereby reducing evapotranspirational demand. Additionally, soils in the Douglas-fir - tanoak associations are generally deeper than in the other two groups.

The competition from tanoak after cutting is directly proportional to the amount of cover before cutting (Tappeiner and McDonald 1983). Tanoak builds a basal burl early in life that is protected from surface

disturbance (fire and cutting) and is capable of resprouting. It is extremely important to establish the crop immediately after harvest to reduce losses in yield. In many cases, measures to favor the crop trees may be necessary, even in established stands, if growth losses are to be avoided.

The last group of associations has no modifier. They are simply the Douglas-fir associations. In terms of plant growth, these are the poorest of the Series. Shallow soils with low water holding capacity, high evaporative demand, and high radiation loads combine to significantly limit growth. Silvicultural techniques that reduce the effects of these problems will increase survival and growth. Directly increasing available water is presently economically impossible, but indirect measures such as reduction of radiation loads, evaporative demand, and competition can be applied beginning with the stand prescription.

Most of the associations in this group have a fair grass crop. Birds and mammals use both the culms and seeds. The sites, generally low in elevation and south facing, can provide warmth in winter and spring. In addition, stand structure is diverse vertically. Birds have a variety of perching, nesting, and foraging opportunties; and mammals have both thermal and hiding cover.

Maintenance of this diversity will be of positive value to wildlife. A creative partial harvest in some areas may well serve the fauna as well as reduce radiation loads for establishing and perpetuating healthy stands with vertical diversity.

Douglas-fir Associations

*Keyed with Douglas-fir Series, but not described.

Key to the Douglas-fir and Ponderosa Pine Series

1a Jeffrey pine present 2

2a White fir present . . . . PSME-ABCO-PIJE (p210)

2b White fir absent 3

3a Sword-fern absent or cover less than 10% . . . . PSME-PIJE (p228)

3b Sword-fern cover greater than 10% 4

1b Jeffrey pine absent 4

4a White fir present in understory 5

5a Pacific rhododendron absent 6

6a Ponderosa pine understory cover greater than Douglas-fir . . . . *PIPO-PSME (p258)

6b Ponderosa pine absent, or understory cover less than Douglas-fir 7

7a Dwarf Oregongrape absent 8

8a Tanoak absent 9

8b Tanoak present 12

9a Sugar pine and California black oak absent from understory; if California black oak present, creeping snowberry cover greater than 15% . . . . PSME-ABCO (p211)

9b Sugar pine and California black oak present in understory; creeping snowberry cover less than 15%, if present . . . . PSME-ABCO-PIPO (p212)

7b Dwarf Oregongrape present 10

10a Creambush oceanspray and/or Piper's Oregongrape present; Douglas-fir cover in understory less than 75%; Pacific yew, if present cover less than 15% . . . . PSME-ABCO/HODI (p213)

10b Creambush oceanspray and Piper's Oregongrape absent; if present, Douglas-fir cover in understory greater than 75%; Pacific yew, if present, cover greater 15% 11

*See Ponderosa Pine Series.

11a Sugarpine, ponderosa pine, California black oak, and prince's pine all present . . . . . PSME-ABCO-PIPO (p212)

11b One or more of the above absent . . . . PSME-ABCO/BENE (p214)

5b Pacific rhododendron present 12

4b White fir absent in understory 12

12a Pacific rhododendron present 13

13a Queen's cup absent . . . . PSME/RHMA (p215)

13b Queen's cup present . . . . PSME/QUSA (p221)

12b Pacific rhododendron absent 14

14a Tanoak present 15

15a Salal present PSME-LIDE3/GASH (p216)

15b Salal absent 16

16a Sugar pine and/or ponderosa pine present in understory 17

17a Poison oak absent PSME-LIDE3-PILA (p217)

17b Poison oak present PSME-LIDE3/RHDI (p218)

16b Sugar pine and ponderosa pine absent from understory 18

18a Poison oak absent PSME-LIDE3 (p219)

18b Poison oak present PSME-LIDE3-QUCH (p220)

14b Tanoak absent 19

19a Creeping Oregongrape present; hairy honeysuckle and poison oak absent . . . . PSME/BERE (p222)

19b Creeping Oregongrape absent; hairy honeysuckle and/or poison oak may be present 20

20a Dwarf Oregongrape present . . . . PSME/BENE (p224)

20b Dwarf Oregongrape absent 21

21a Piper's Oregongrape present 22

22a Poison oak present 23

23a Ponderosa pine understory cover greater than Douglas-fir . . . . PIPO-PSME (p258)

23b Poison oak absent . . . . PSME/RHDI-BEPI (p224)

22b Poison oak absent . . . . PSME-PIPO (p226)

21b Piper's Oregongrape absent 24

24a Poison oak present . . . . PSME/RHDI (p225)

24b Poison oak absent . . . . PSME/Depauperate (p227)

DOUGLAS-FIR SERIES SUMMARY
PSME N = 188

EXTENT: Principally inland Districts, but also on Gold Beach, Chetco, and Powers.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3200	1071	300-6600
Aspect (deg)	242	102	All
Slope (%)	44	22	0-120
Soil Depth (in)	34	14	6-50+
Total BA (ft^2)	254	133	0-720

GENERAL DESCRIPTION

Litter cover is 80%, moss is 18%, bare-ground is 5%, and rock is 9%.

VEGETATION: (See pages 229-255 for complete tables)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	48	94	Climax
sugar pine (PILA)	14	34	Seral
ponderosa pine (PIPO)	22	35	Seral to minor climax
Tree Understory			
Douglas-fir (PSME)	27	95	Climax
white fir (ABCO)	5	28	Seral on better sites
Pacific madrone (ARME)	12	63	Seral
golden chinquapin (CACH)	16	27	Often indicates shallow or infertile soils
tanoak (LIDE3)	13	28	Can be vegetation management problem
sugar pine (PILA)	5	33	Seral, good growth
canyon live oak (QUCH)	14	49	Poorer sites
California black oak (QUKE)	10	30	Seral

Shrub, Herb & Grass

dwarf Oregongrape (BENE)	15	38	Occurs on the best PSME sites
Piper's Oregongrape (BEPI)	5	25	Often on rock contacts and rocky soil
western prince's pine (CHUM)	4	27	Ubiquitous
creambush oceanspray (HODI)	6	29	Common in PSME series
hairy honeysuckle (LOHI)	3	25	Indicates hot sites with RHDI
poison oak (RHDI)	13	38	Indicates hot sites
baldhip rose (ROGY)	3	56	Common
creeping snowberry (SYMO)	7	44	Common
whipplevine (WHMO)	8	29	Dry site ground cover
Oregon fairy-bell (DIHOO)	2	34	Usually on wetter sites
cleavers bedstraw (GAAP)	4	27	Occasionally present
western rattlesnake-plantain (GOOB)	1	43	Ubiquitous
white-flowered hawkweed (HIAL)	2	39	Often occurs on productive sites
sword-fern (POMU)	5	36	On wettest microsites
bracken (PTAQ)	4	34	On the more productive PSME sites
western starflower (TRLA2)	3	37	Indicates shallow ground disturbance
all grasses	7	100	Occurs more often on poorer sites

DOUGLAS-FIR - WHITE FIR - JEFFREY PINE
PSME-ABCO-PIJE N = 5

EXTENT: Ashland, Applegate, and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	5024	676	3950-5800
Aspect (deg)	124	61	NE to SE
Slope (%)	47	8	40-60
Soil Depth (in)	26	14	12-48
Total BA (ft^2)	224	55	140-280

GENERAL DESCRIPTION

Serpentine and periodotite parent materials, usually in convexities. Litter is 80%, moss is low at less than 1%, bareground is high at 10%, and rock is 11%.

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Jeffrey pine (PIJE)	17	80	Minor climax
Douglas-fir (PSME)	14	100	Climax
incense-cedar (CADE3)	17	100	Seral
Tree Understory			
Jeffrey pine (PIJE)	11	100	Coclimax
Douglas-fir (PSME)	26	100	Climax
white fir (ABCO)	2	100	Coclimax
incense-cedar (CADE3)	4	100	Fair productivity
Shrub, Herb & Grass			
creambush oceanspray (HODI)	3	60	Pair cover on better PSME sites
beargrass (XETE)	10	60	Occurs on coastal PSME associations and ultrabasics inland

DISCUSSION: This Association is relatively productive for ultrabasic parent rock; basal areas can be as high 280 square feet (rarely more). Another indication that the soil chemical imbalance is dampened is the presence of white fir. It cannot tolerate the usual ultrabasic chemical extremes and is only found where calcium and magnesium are more in balance and moisture is more available. Species selected for planting

may be Douglas-fir, Jeffrey pine (*Pinus jeffreyi*), white fir, or incense-cedar (*Calocedrus decurens*). Western white pine (*P. monticola*) will do well on the coldest sites and sugar pine (*P. lambertiana*) will produce well on the deeper soils and/or moister sites.

These sites may get some animal use. Many southern exposures have high grass cover and patches of highly palatable shrubs. Consequently they provide exposure to direct radiation and food in the early spring.

DOUGLAS-FIR - WHITE FIR
PSME-ABCO N = 5

EXTENT: Applegate, Ashland, and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4640	808	3800-5920
Aspect (deg)	183	88	84-318
Slope (%)	47	30	7-89
Soil Depth (in)	25	10	14-36
Total BA (ft^2)	204	70	120-300

GENERAL DESCRIPTION

Granodiorite, gabbro, and metavolcanic parent materials on all forms of topography. Litter is average at 82%; but moss (3%) is low and bareground (13%) and rock (25%) are high.

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	29	100	Climax
ponderosa pine (PIPO)	30	60	Seral
Tree Understory			
Douglas-fir (PSME)	20	100	Climax
white fir (ABCO)	7	100	Seral to minor climax
Shrub, Herb & Grass			
creambush oceanspray (HODI)	6	80	Fair cover on better PSME sites
creeping snowberry (SYMO)	16	80	Common in the Series
woods strawberry (FRVEB)	19	80	Indications unknown
western starflower (TRLA2)	1	80	Often indicates surface disturbance

DISCUSSION: The PSME-ABCO Association is cool and dry. It occurs quite often on high elevation granitics on south aspects. The high elevation accounts for its coolness; the south facing granitics for its dryness. This combination of environment can cause reforestation difficulties. Springtime soil temperatures in high elevation granitics are often low enough to limit water uptake even though air temperature is high. Desiccation often results; in addition, soil surface temperatures can become hot enough to directly damage seedling tissue. An indirect effect of the high surface temperatures and high porosity is rapid

moisture loss. On these sites moisture may limit survival even in early spring. Thus, the planting "window" is short, and fall planting and natural reproduction are alternatives that should be examined. In order of decreasing appropriateness Douglas-fir, ponderosa pine (*Pinus ponderosa*), incense-cedar, sugar pine, and white fir can be used for regeneration. White fir and sugar pine will perform best on the moister, protected sites. Ponderosa pine will do well on hot sites, severely disturbed sites, or spots that have been burned too hot.

DOUGLAS-FIR - WHITE FIR - PONDEROSA PINE
PSME-ABCO-PIPO N = 13

EXTENT: Applegate, some on Galice, and possibly Illinois Valley District.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	3727	610	3110-5240	Metasediments, metavolcanics, schists, and gabbro; convexities on all slope positions.
Aspect (deg)	254	85	Mostly S-NW	Litter (100%) is high, moss (8%) is low; bare-ground (2%), and rock (8%).
Slope (%)	32	21	0-71	
Soil Depth (in)	37	16	12-50+	
Total BA (ft²)	382	126	220-620	

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	34	100	Climax to coclimax
sugar pine (PILA)	15	54	Seral to minor climax
ponderosa pine (PIPO)	38	85	Seral to minor climax
Tree Understory			
Douglas-fir (PSME)	54	100	Good growth
white fir (ABCO)	5	85	Fair growth
sugar pine (PILA)	9	77	Good growth
Pacific madrone (ARME)	14	85	Sprouts, high rate of nutrient turn around
ponderosa pine (PIPO)	10	69	Best growth on hottest sites
Shrub, Herb & Grass			
baldhip rose (ROGY)	3	92	Ubiquitous
Piper's Oregongrape (BEPI)	5	54	Occurs on rocky spots or poor soils
creeping snowberry (SYMO)	2	54	Common for the Series
spreading dogbane (APAN)	2	69	Usually occurs on hot dry soils
woods strawberry (FRVEB)	2	69	Indications unknown
white-flowered hawkweed (HIAL)	2	69	Often indicates high basal area
slender-tubed iris (IRCH)	1	62	Common
California brome (BRCA)	12	46	Indications unknown

DISCUSSION: Both the high basal area and diversity of shrubs and herbs allow a number of management alternatives in this Association. Some of the sampled plots placed in this Association were relatively young. Several species (ponderosa pine, Pacific madrone (Arbutus menziesii), and sugar pine) are indicators of recent disturbance. Although some of the diversity is caused by disturbance, most is related to site capacity. Douglas-fir, sugar pine, ponderosa pine, white fir, and incense-cedar are all appropriate for regenerating this Association. Ponderosa pine is the most efficient species where Piper's Oregongrape (Berberis piperiana) occurs; these are the hottest sites with the shallowest soils. Incense-cedar is also appropriate on hot sites but its growth is usually slower than ponderosa pine. Encouragement of naturals can be important. Hotter sites within this Association may be difficult to reforest. As always, but even more significant in the Douglas-fir Series, care of the soil can mean the difference between regeneration success or failure and, of course, sustained productivity.

DOUGLAS-FIR - WHITE FIR/CREAMBUSH OCEANSPRAY
PSME-ABCO/HODI N = 8

EXTENT: Mostly Applegate and some Ashland, Illinois Valley, and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3623	724	2320-4600
Aspect (deg)	21	89	E-SW
Slope (%)	40	26	2-70
Soil Depth (in)	37	14	14-50+
Total BA (ft²)	342	94	220-500

GENERAL DESCRIPTION

Mostly metavolcanic and metasediment parent rock some granodiorite and recent materials; alluvials. Slope positions from upper 1/3 to lower 1/3 on all forms of tooography. Litter 92%, moss 15%, bareground less than 1%, and rock 2%.

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	59	100	Climax to coclimax
Tree Understory			
Douglas-fir (PSME)	24	100	Good growth
canyon live oak (QUCH)	4	63	Indicates poor site when abundant
white fir (ABCO)	4	100	Good growth
Pacific madrone (ARME)	14	75	Vegetation management problem
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	29	100	Usually occurs on better sites
baldhip rose (ROGY)	5	100	Ubiquitous
creambush oceanspray (HODI)	5	88	Common in the Series
creeping snowberry (SYMO)	4	88	Common
Oregon fairy-bell (DIHOO)	1	88	Usually on soils with cooler surfaces
western rattlesnake-plantain (GOOB)	1	88	Ubiquitious

DISCUSSION: The fact that white fir regeneration is present in this Association is an indication that it is moderately dry and not extremely dry, as are many Douglas-fir associations. The driest sites have poison

oak (Rhus diversiloba) and Piper's Oregongrape. On the most moderate sites one or both are absent and total herb cover is high, usually greater than 70 percent. Douglas-fir is the better performer in the Association; white fir can survive but will often experience transpirational stress and reduced growth. Both ponderosa pine and sugar pine can be used and will perform well.

DOUGLAS-FIR - WHITE FIR/DWARF OREGONGRAPE
PSME-ABCO/BENE N = 15

EXTENT: Applegate and Illinois Valley Districts, some Ashland and Galice also.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3879	906	2240-5650
Aspect (deg)	348	95	All
Slope (%)	43	17	14-71
Soil Depth (in)	42	15	18-50+
Total BA (ft^2)	379	176	160-720

GENERAL DESCRIPTION

Metavolcanic, metasediment, granodiorite, and gneiss parent materials; predominantly on convexities on all slope positions. Litter 86%, moss 26%, bareground 1%, and rock 9%.

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	61	100	Climax to coclimax
Tree Understory			
Douglas-fir (PSME)	22	100	Good growth
white fir (ABCO)	8	100	Good growth
golden chinquapin (CACH)	20	67	Often indicates shallow or poor soils
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	13	100	Usually high covers mean more productive sites
western prince's pine (CHUM)	4	80	Ubiquitous
baldhip rose (ROGY)	2	100	Common
trailing blackberry (RUUR)	2	87	Common, proliferates when disturbed
creeping snowberry (SYMO)	2	73	Common
western rattlesnake-plantain (GOOB)	1	93	Ubiquitous

DISCUSSION: This is one of the most productive Associations of the Douglas-fir Series. It is scattered throughout the Siskiyous, usually in concavities where atmospheric moisture (humidity and fog) dampens the

evapotranspirational demand. Soils are deep, sometimes residual, but most often colluvial. Douglas-fir and white fir grow well. Sugar pine, incense-cedar, and ponderosa pine (hottest sites) will also perform well but are less appropriate for maximizing timber production. Ponderosa pine would perform well in areas with golden chinquapin (*Castanopsis chrysophylla*). If, however, the golden chinquapin is thick, competition will affect growth. Trailing blackberry (*Rubus ursinus*) may be a barrier to planters if the site is burned and planting is delayed. Burning often stimulates its growth.

DOUGLAS-FIR/PACIFIC RHODODENDRON
PSME/RHMA N = 13

EXTENT: Siskiyou National Forest, mostly coastal Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2991	580	1780-3660
Aspect (deg)	8	108	All
Slope (%)	30	18	2-70
Soil Depth (in)	42	9	20-50+
Total BA (ft^2)	252	85	80-420

GENERAL DESCRIPTION

Metasediment, metavolcanic, schist, and sandstone parent materials usually on flat topography at the upper 1/3 of slope. Some at lower slope positions on varying topography. Litter cover is average (81%), moss (22%), bareground (2%), and rock (2%).

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	70	100	Climax
Tree Understory			
Douglas-fir (PSME)	17	100	Good growth
golden chinquapin (CACH)	12	62	Very shade tolerant
Sadler oak (QUSA)	22	46	Usually higher elevation or cooler spots
tanoak (LIDE3)	8	62	Minor climax
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	12	77	Usually occurs on better sites
salal (GASH)	49	92	Uncommon in Series - coastally influenced sites
Pacific rhododendron (RHMA)	67	100	Uncommon in Series - coastally influenced sites
beargrass (XETE)	5	69	Usually coastally influenced sites
all shrubs	134	100	

DISCUSSION: The PSME/RHMA Association occurs mostly on the coast but fingers inland where coastal influence locally modifies the environment. It also occurs on the Applegate, Illinois Valley, and Galice Districts

in areas that tend to imitate coastal conditions. Both Pacific rhododendron (Rhododendron macrophyllum) and salal (Gaultheria shallon) are at their environmental limit. They rarely occupy drier sites. Thus, this Association represents one of the more moist Douglas-fir associations; yet it is warmer than the group of PSME-ABCO Associations. Douglas-fir, sugar pine, and incense-cedar are all appropriate for regeneration. Port-Orford-cedar (Chamaecyparis lawsoniana) would be appropriate in the most moist, concave sites. Inland, this Association often occurs as a stringer within the White Fir Series and as such provides diversity of wildlife habitat.

DOUGLAS-FIR - TANOAK/SALAL
PSME-LIDE3/GASH N = 6

EXTENT: Galice and Illinois Valley Districts, and inland on Gold Beach.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2518	484	1780-3070
Aspect (deg)	87	55	NE-SE
Slope (%)	43	18	18-70
Soil Depth (in)	35	14	15-50+
Total BA (ft^2)	267	79	200-360

GENERAL DESCRIPTION

Metasediment, gabbro, and granodiorite parent materials on flat to convex topography at middle to lower 1/3 slope positions. Litter cover is 81%, moss is 22%, bareground is 2%, and rock is 2%.

VEGETATION: (See page 229 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	63	100	Climax to coclimax
sugar pine (PILA)	17	83	Seral to minor climax
Tree Understory			
Douglas-fir (PSME)	28	100	Good growth
sugar pine (PILA)	7	67	Good growth
golden chinquapin (CACH)	28	67	Indicative of shallow or poor soils
canyon live oak (QUCH)	16	83	Seral or minor climax on dry sites
tanoak (LIDE3)	19	100	Coclimax to minor climax
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	8	83	Occurs on better sites.
salal (GASH)	37	100	The taller the plant the better the site
baldhip rose (ROGY)	5	100	Common
spreading dogbane (APAN)	2	67	Occurs on warmer soils
bracken (PTAQ)	3	67	Common

DISCUSSION: Douglas-fir in the understory regeneration layer is indicative of the warmer associations of the Siskiyous, but when found with tanoak it is an indication that the site is slightly more mesic. That is why

several assoications in the Douglas-fir Series are modified with the tanoak name (LIDE3); they are more mesic than similar associations without tanoak. Douglas-fir, sugar pine, incense-cedar and in some cases ponderosa pine are all appropriate for regeneration. Tanoak can be a very serious competitor with the crop trees. Its seriousness will be directly proportional to the amount present before cutting.

DOUGLAS-FIR - TANOAK - SUGAR PINE
PSME-LIDE3-PILA N = 7

EXTENT: Galice District, possibly Illinois Valley.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	3174	481	2220-3660	Metamorphosed sediments and volcanics, possibly some moderated serpentine situations on mid to upper 1/3 of slopes on generally flat topography. Litter cover is 84%, moss is low at 6%, bareground is 4%, and rock is 2%.
Aspect (deg)	189	89	All	
Slope (%)	47	14	34-75	
Soil Depth (in)	29	15	15-50+	
Total BA (ft^2)	206	47	160-300	

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	48	100	Climax
sugar pine (PILA)	11	86	Seral
Tree Understory			
Douglas-fir (PSME)	41	100	Good growth
canyon live oak (QUCH)	11	86	Shallow and/or disturbed sites
golden chinquapin (CACH)	14	100	Nutrient poor soils or shallow soils
sugar pine (PILA)	6	100	Usually on better PSME Associations
Pacific madrone (ARME)	17	86	Fire indicator
tanoak (LIDE3)	21	100	Competition problem
Shrub, Herb & Grass			
western prince's pine (CHUM)	8	71	Ubiquitious
toothleaf pyrola (PYDE)	2	57	The most drought tolerant pyrola
ground-cone (BOST2)	1	57	Seems to perfer madrone duff

DISCUSSION: This Association is slightly drier than the PSME-LIDE3/GASH Associaton and sugar pine is more productive here. Competition control and stocking level control are important in maintaining maximum growth. Moisture and chemicals are often limiting and high stocking densities waste resources through subordinate crown classes and competitors.

Mature stands are low in forage but early seral conditions provide forage, browse, and acorns for deer. The combination of shrub species provide hiding cover, and later in the rotation, thermal cover.

DOUGLAS-FIR - TANOAK/POISON OAK
PSME-LIDE3/RHDI N = 16

EXTENT: Galice and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	2204	525	1360-3330	Metasediment, meta-volcanics, and gabbro
Aspect (deg)	186	80	All	parent material. Flat to convex and concave
Slope (%)	51	17	15-80	topography on middle 1/3 of slope to ridgetop.
Soil Depth (in)	28	13	12-50+	Ground surface covers are litter 75%, moss 14%,
Total BA (ft^2)	245	104	120-460	bare-ground 6%, and rock 3%.

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	44	100	Climax
sugar pine (PILA)	20	69	Seral
Tree Understory			
Douglas-fir (PSME)	25	100	Good growth
sugar pine (PILA)	5	93	Good growth
Pacific madrone (ARME)	11	81	Fire indicator
California black oak (QUKE)	11	75	Indicates disturbance and droughty soils
tanoak (LIDE3)	11	100	Coclimax to seral
Shrub, Herb & Grass			
hairy honeysuckle (LOHI)	3	69	With RHDI it indicates regeneration problems
poison oak (RHDI)	12	100	With LOHI it indicates regeneration problems
baldhip rose (ROGY)	2	75	Ubiquitous
white-flowered hawkweed (HIAL)	2	88	Common in this Association
bracken (PTAQ)	5	81	Common
spreading dogbane (APAN)	2	56	On warm, dry soils
woodland tarweed (MAMA)	2	56	On hot soils
bearded fescue (FESU)	15	50	Indications unknown

DISCUSSION: The southerly aspects and shallow soils indicate potential for reforestation failures. Unit boundary modification is one of many alternatives that can be used to reduce the effects of intense radiation on a site with a limited soil reservoir. The use of naturals, whether advanced or post harvest, should be encouraged. Sugar pine and Douglas-fir are appropriate and will perform well. Incense-cedar and ponderosa pine are also appropriate. Incense-cedar is a slow grower but ponderosa pine produces well, particularly in the juvenile stages. Most plants in this Association indicate warm to hot surface soils.

DOUGLAS-FIR - TANOAK
PSME-LIDE3 N = 10

EXTENT: Illinois Valley and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3071	800	1910-4100
Aspect (deg)	291	65	W-NW
Slope (%)	42	22	8-80
Soil Depth (in)	41	11	25-50+
Total BA (ft^2)	340	88	240-560

GENERAL DESCRIPTION

Metasediment and metavolcanic parent materials on all topographic forms. Litter cover is 90%, moss 14%, bareground 4%, and rock 9%.

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	69	100	Climax to coclimax
Tree Understory			
Douglas-fir (PSME)	19	100	Good growth
tanoak (LIDE3)	11	100	Coclimax
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	17	70	Often indicates better sites
creeping snowberry (SYMO)	14	70	Common

DISCUSSION: This is a commonly occurring association with a moderately warm environment. Productivity is high and a number of species may be used for reforestation. Douglas-fir, incense-cedar, ponderosa pine, and even white fir may be used on the cooler, more mesic sites. Sugar pine is rare in this Association. Notice that the average soil depth (41 inches) is significantly deeper than the PSME-LIDE3/RHDI Association (28 inches). Poison oak is often indicative of shallow, hot soils. Although the sites are generally less limiting to growth than on other associations, tanoak can be serious competition to crop trees.

DOUGLAS-FIR - TANOAK - CANYON LIVE OAK
PSME-LIDE3-QUCH N = 15

EXTENT: Galice, Illinois Valley, and inland Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2489	828	300-3280
Aspect (deg)	359	93	All
Slope (%)	47	24	0-87
Soil Depth (in)	33	13	12-50+
Total BA (ft^2)	264	115	100-520

GENERAL DESCRIPTION

Mostly metavolcanic and metasediment; some serpentine, peridotite, mudstone, and recent alluvial parent materials on all slope positions and topography. Litter cover is average (80%) moss high (29%), bareground (2%), and rock (11%).

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	52	100	Climax to coclimax
Tree Understory			
Douglas-fir (PSME)	30	100	Good growth
canyon live oak (QUCH)	17	80	Indicates shallow soils and/or disturbance
Pacific madrone (ARME)	7	87	Indicates fine disturbance
tanoak (LIDE3)	14	100	Coclimax
Shrub, Herb & Grass			
poison oak (RHDI)	10	93	Can cause a skin rash
sword-fern (POMU)	9	80	Common

DISCUSSION: This is a highly variable association differing from the PSME-LIDE3/RHDI Association in that sugar pine rarely occurs. There are several other floristic differences between the two Associations. California black oak (*Quercus kelloggii*) is only rarely found (7 percent of plots). In addition spreading dogbane (*Apocynum androsaemifolium*) and white-flowered hawkweed (*Hieracium albiflorum*) are absent from the PSME-LIDE3-QUCH Association. Douglas-fir and incense-cedar are appropriate for regeneration. White fir and sugar pine can be used on the more mesic sites - those with vanillaleaf (*Achlys triphylla*) and trail-plant (*Adenocaulon bicolor*). Tanoak competition should be considered in prescriptions; it could significantly reduce crop tree growth. Surface rock, particularly on sites with greater than 20 percent canyon live oak (*Quercus chrysolepis*), may be a physical barrier to planting.

DOUGLAS-FIR - SADLER OAK
PSME-QUSA N = 2

EXTENT: Illinois Valley District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3675	785	3120-4230
Aspect (deg)	359	46	318-45
Slope (%)	30	21	15-45
Soil Depth (in)	30	5	26-34
Total BA (ft²)	300	85	240-360

GENERAL DESCRIPTION

Metavolcanic and granodiorite parent materials on lower 1/3 of slope. Litter cover is 68%, moss 18%, bareground 0%, but rock high at 15%.

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	50	100	Climax
Tree Understory			
Douglas-fir (PSME)	29	100	Fair growth
golden chinquapin (CACH)	12	100	Indicates shallow and/or nutrient poor soil
Sadler oak (QUSA)	11	100	Cool sites often with shallow soil
Shrub, Herb & Grass			
western prince's-pine (CHUM)	12	100	Ubiquitous
dwarf Oregongrape (BENE)	6	100	Usually on deep soil
red huckleberry (VAPA)	3	100	Often occurs on wetter microsites
Pacific rhododendron (RHMA)	2	100	
western twinflower (LIBOL)	3	100	
vanillaleaf (ACTR)	5	100	
queen's cup (CLUN)	3	100	On cooler soils
western rattlesnake-plantain (GOOB)	6	100	Ubiquitous

DISCUSSION: Two plots, obvious climax to Douglas-fir and distinctly different from all other associations, were found on the Illinois Valley District. Because they are so different they are tentatively reported as an association. These plots may not represent enough land area to justify a final management oriented classification; but as this document is field tested, their importance will be clarified. Environmentally speaking, this Association is moderately mesic.

DOUGLAS-FIR/CREEPING OREGONGRAPE
PSME/BERE N = 6

EXTENT: Ashland District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4548	1059	3700-6600
Aspect (deg)	231	87	N-E-S
Slope (%)	45	18	28-72
Soil Depth (in)	46	6	42-50+
Total BA (ft^2)	277	89	160-380

GENERAL DESCRIPTION

Limited to granodiorite parent material on convex upper 1/3 to ridgetop positions. Litter cover (70%), moss is low (2%), bareground (6%), and rock is low (2%).

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	55	100	Climax
Tree Understory			
Douglas-fir (PSME)	16	83	Fair growth
Pacific madrone (ARME)	12	100	Indicates fire disturbance
Shrub, Herb & Grass			
creambush oceanspray (HODI)	14	100	Common in the PSM Series
creeping Oregongrape (BERE)	20	100	Usually on limited sites
western starflower (TRLA2)	3	100	Occurs where surface soil is disturbed
bigleaf sandwort (ARMA3)	5	83	Common at higher elevations

DISCUSSION: This is a very distinct association, limited in occurrence. All plots were on granodiorite with significant cover of creeping Oregongrape (*Berberis repens*). Reforestation will be difficult particularly on south aspects. The coarse soils have low water holding capacity and dry out early in the growing season, causing seedling moisture stress. Without much water they have a low heat capacity which contributes to wide surface temperature fluctuation. At high elevation frost heaving may be followed by seedling damage due to extremely high soil temperatures. Treatment of the soil during any operation is the most important consideration on these sites. They are extremely fragile and even slight

damage greatly reduces their productivity, stability, fertility, and ability to receive and hold water. Both Douglas-fir and ponderosa pine will do well if the extremes in soil surface temperatures and moisture stress are dampened. Incense-cedar can also be used. It would also be advisable to adjust prescriptions to allow for natural seeding.

DOUGLAS-FIR/DWARF OREGONGRAPE
PSME/BENE N = 9

EXTENT: Applegate District and some Illinois Valley.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3050	443	2310-3710
Aspect (deg)	350	62	Mostly NW-NE
Slope (%)	49	23	5-70
Soil Depth (in)	41	12	20-50+
Total BA (ft²)	307	118	120-460

GENERAL DESCRIPTION

Metavolcanics, schists, and metasediment parent materials generally on lower 1/3 convexities to upper 1/3 concavities. Litter cover is above Series average (96%), moss is very high (87%), and bareground (1%).

VEGETATION: (See page 238 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	78	100	Climax
Tree Understory			
Douglas-fir (PSME)	50	89	Good growth
Pacific madrone (ARME)	4	89	Seral, indicate fire history
Shrub, Herb & Grass			
dwarf Oregongrape (BENE)	18	100	Usually on deep soils
baldhip rose (ROGY)	4	100	Ubiquitous
creambush oceanspray (HODI)	13	89	Common in the Series
Piper's Oregongrape (BEPI)	7	89	Usually occurs on rocky or shallow soils
California hazel (COCOC)	6	100	Usually requires warm, moist environment
western starflower (TRLA2)	3	100	Pioneers or surface disturbance
trail-plant (ADBI)	2	89	Common in the Series
Oregon fairy-bell (DIHOC)	3	100	Usually on cooler sites

DISCUSSION: Although this Association has both poison oak and hairy honeysuckle (*Lonicera hispidula*) it is the most productive association in the "dry end" of the Series. The soils are deep and of mixed origin. Aspects are northerly. White fir, incense-cedar, ponderosa pine, and

sugar pine occur sporadically. Douglas-fir is constant and productive throughout. California hazel (_Corylus cornuta californica_) occurs with 100 percent constancy and surface moss cover is extremely high, suggesting a warm but atmospherically moist environment. Several natural grasses could be used for erosion control and at the same time produce wildlife forage. California brome (_Bromus carinatus_) is most common.

DOUGLAS-FIR/POISON OAK - PIPER'S OREGONGRAPE
PSME/RHDI-BEPI N = 12

EXTENT: Applegate, some Illinois Valley and Powers and possibly Galice and Gold Beach Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	2947	892	1740-4880
Aspect (deg)	217	74	Mostly S
Slope (%)	49	29	8-120
Soil Depth (in)	37	15	12-50+
Total BA (ft²)	260	100	150-500

GENERAL DESCRIPTION

Metavolcanics and some metasediments on all slope positions and topography. Litter cover is 90%, moss is 16%, bareground is 6%.

VEGETATION: (See page 247 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	58	92	Climax
ponderosa pine (PIPO)	13	75	Seral
Tree Understory			
Douglas-fir (PSME)	26	100	Fair growth
Pacific madrone (ARME)	16	75	Indicates disturbance or fire
California black oak (QUKE)	16	67	A migratory oak
Shrub, Herb & Grass			
Piper's Oregongrape (BEPI)	4	100	Often occurs on shallow, rocky soils
poison oak (RHDI)	22	100	Occurs on warm, well aerated soils

DISCUSSION: Both ponderosa pine and Douglas-fir are appropriate for regeneration on this hot, dry Association. Moisture is the most limiting growth factor. If sugar pine is used in the species mixture, is should be placed in the most mesic microsites. Fescue (*Festuca* spp.) and bluegrass (*Poa* spp.) occur and could be enhanced for erosion control and forage. Many of the sites are used for winter range. Burning or disturbance may stimulate the seeds of deerbrush ceanothus (*Ceanothus integerrimus*) even where it is not present. Usually the hotter the burn the more intense the invasion. If vegetation management alternatives are limited, not burning should be considered.

DOUGLAS-FIR/POISON OAK
PSME/RHDI N = 13

EXTENT: Galice, Ashland, Applegate, Gold Beach, and Illinois Valley Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1988	1241	300-4250
Aspect (deg)	134	80	Mostly E
Slope (%)	50	28	9-110
Soil Depth (in)	29	18	6-50+
Total BA (ft²)	170	82	20-320

GENERAL DESCRIPTION

Mudstone, granodiorite, metavolcanic, metasediment, gabbro, and schist; mostly on lower to mid 1/3 of slope on a variety of topography. Litter cover is less than Series average (53%), moss is high (27%), bareground (7%), and rock (12%).

VEGETATION: (See page 247 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	34	85	Climax
Tree Understory			
Douglas-fir (PSME)	24	85	Fair growth
canyon live oak (QUCH)	22	77	Shallow and/or disturbed sites
Pacific madrone (ARME)	12	92	Clumps indicate several fires
California black oak (QUKE)		22	54 Indicates disturbance
Shrub, Herb & Grass			
poison oak (RHDI)	19	100	On warm to hot sites

DISCUSSION: The PSME/RHDI Association has shallower soils; is less productive; and is drier, hotter, and more limited than the PSME/RHDI-BEPI Association. Moisture stress problems are magnified. There are fewer forbs and more grasses. The grasses quite often finish their vegetative and reproduction cycles before moisture becomes limiting. Thus, on sites with limited moisture, they tend to out-compete the forbs, and will be indicative of tree regeneration problems. Timing and intensity of grass seeding can be critical to both the reduction of erosion and and survival of crop trees. If these sites are severely disturbed and consequently require intensive fall seeding for erosion control, the grasses will seriously compete for moisture with spring-planted seedlings. If

the site is not seriously disturbed, seeding rates can be reduced. If both seeding and planting are completed by fall, competition will be greatly reduced, but still significant. If site damage is minimal with winter logging and planting is completed in the spring, then fall seeding of grass will provide even less competition for the crop trees.

DOUGLAS-FIR - PONDEROSA PINE
PSME-PIPO N = 4

EXTENT: Applegate and possibly Ashland District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	4040	477	3500-4480
Aspect (deg)	246	73	S-SW
Slope (%)	48	32	5-80
Soil Depth (in)	36	13	18-50+
Total BA (ft^2)	200	214	0-440

GENERAL DESCRIPTION

Metavolcanic and schist parent materials on varying topography at upper 1/3 slope to ridgetop positions. Litter cover (85%), moss (0%), and bareground (2%).

VEGETATION: (See page 247 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	3	25	Climax to coclimax
ponderosa pine (PIPO)	50	75	Seral to coclimax
Tree Understory			
Douglas-fir (PSME)	70	75	Fair growth
ponderosa pine (PIPO)	22	75	Fair growth
canyon live oak (QUCH)	6	100	On shallow and/or disturbed soils
Pacific madrone (ARME)	40	75	Indicates past fires
Shrub, Herb & Grass			
Piper's Oregongrape (BEPI)	2	100	Usually on shallow, rocky soils
deerbrush ceanothus (CEIN)	10	75	Indicates past fire
sickle-keeled lupine (LUAL)	6	100	Nitrogen fixer
slender-tubed iris (IRCH)	1	75	Adds color to cutbanks
California brome (BRCA)	14	75	

DISCUSSION: This Association is hot and dry. Moisture is limiting and soil temperatures can become lethal to seedling where soils are dark, coarse, dry, and lack litter cover. As with many of the drier Douglas-fir associations grass can be a signficant competitor. Seedling survival may at times depend on its control. Deerbrush ceanothus is another serious competitor and can invade sites that have been disturbed or

burned. Because this is a relatively warm association at middle elevations, it is often used by deer in the winter. Browse and forage are commonly available. Both Douglas-fir and ponderosa pine are appropriate for these sites; Douglas-fir may be slightly more productive. Sugar pine and incense-cedar are less productive but can be used on the best sites of the Association.

DOUGLAS-FIR/Depauperate
PSME/Depauperate N = 13

EXTENT: Ashland, and some Applegate, Illinois Valley, and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3509	982	1130-4600
Aspect (deg)	230	89	SE-NW
Slope (%)	49	20	5-74
Soil Depth (in)	34	9	16-50+
Total BA (ft^2)	115	78	0-260

GENERAL DESCRIPTION

Granodiorite, metavolcanic, metasediment, and gneiss parent materials on all forms of topography. Litter cover is less than Series average (56%), moss is low (8%), bareground is high (17%), and rock is high (17%).

VEGETATION: (See page 247 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	19	100	Climax
ponderosa pine (PIPO)	15	54	Seral
Tree Understory			
Douglas-fir (PSME)	21	85	Fair growth
Shrub, Herb & Grass			
woodland tarweed (MAMA)	3	46	Indicates hot dry sites

DISCUSSION: The majority of the area representative of this Association is on hot, dry, granitic parent materials. The general description above is indicative of the extremes in this Association. Regeneration will be difficult under the moisture limiting conditions and all possible methods of amelioration should be considered; in some cases shelterwood cutting. Burning could be extremely damaging to the organic portion of soil, particularly on the granitic sites. It is the major source of cation exchange capacity in granitic soils. In addition, burning could stimulate the germination and invasion of deerbrush ceanothus. Because the sites are highly erosive, control is essential. However, it should be closely coordinated with timber objectives (timing and intensity) to reduce the effects of competition with the crop trees.

DOUGAS-FIR - JEFFREY PINE
PSME-PIJE N = 8

EXTENT: Illinois Valley, some Gold Beach and Applegate Districts, and possibly Galice.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3016	520	2280-3720
Aspect (deg)	306	87	All
Slope (%)	29	12	10-45
Soil Depth (in)	19	9	8-33
Total BA (ft^2)	136	81	40-300

GENERAL DESCRIPTION

Serpentine, peridotite, and metavolcanic (probably ultrabasic influenced) parent materials on mid slope to ridgetop positions. Litter cover is 72%, moss 8%, bareground 13%, and rock 29%.

VEGETATION: (See page 247 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Douglas-fir (PSME)	21	75	Climax
Jeffrey pine (PIJE)	16	100	Seral to coclimax
Tree Understory			
Douglas-fir (PSME)	12	100	Good growth
Jeffrey pine (PIJE)	5	63	Poor growth
incense-cedar (CADE3)	6	63	Fair growth
Shrub, Herb & Grass			
beargrass (XETE)	11	63	Often indicates nutrient problems
sedges (CAREX)	3	50	Highly variable as an indicator

DISCUSSION: The ultrabasic parent rock and soil is the major influence on the composition of this Association. Soils are shallow and imbalanced with a high percentage of surface rock. Regeneration will be both physically and biologically difficult. Jeffrey pine, Douglas-fir, incense-cedar, and western white pine will all survive, although growth will be slow. Western white pine will be most efficient at the higher elevation sites. The open canopy allows considerable soil surface warming during clear winter days. Consequently, deer use the shrubs for hiding cover as they gather heat.

TABLE 13: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RIMA		PSME-LIDE3-GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons[1] (%)	Mean[2] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:														
ELEV	100	5024	100	4640	100	3727	100	3623	100	3879	100	2991	100	2518
ASPECT	100	124	100	183	100	254	100	21	100	348	100	8	100	87
SLOPE	100	47	100	47	100	32	100	40	100	43	100	30	100	43
TODPTH	100	26	80	25	100	37	100	37	100	42	100	42	100	35
TOTBA	100	224	100	204	100	382	100	342	100	379	100	252	100	267
TREE OVERSTORY:														
PIJE	80	17												
PIMO	40	1												
PSME	100	14	100	29	100	34	100	59	100	61	100	70	100	63
PILA	40	1	20	20	54	15			27	19	38	14	83	17
CADE3	100	17	40	35	15	3	25	16	13	6				
ABCO	20	1	40	6	8	3	38	11	40	14				
PIPO			60	30	85	38	38	9	7	3				
TSHE									7	20				
ABMAS									7	1				
CHLA											8	10		
PIAT											8	15		
PICO														
TOTALO	100	46	100	67	100	75	100	71	100	74	100	78	100	77
TREE UNDERSTORY:														
PIJE	100	11												
PIMO	20	1	20	3										
PSME	100	26	100	20	100	54	100	24	100	22	100	17	100	28
QUCH	20	1	40	29	38	4	63	4	47	9	15	23	83	16
ABCO	100	2	100	7	85	5	100	4	100	8	15	6		
CADE3	100	4	40	35	54	8	13	15	20	2			17	1
CACH	20	1			23	28	38	7	67	20	62	12	67	28
PILA	40	1			77	9	13	1	27	4	31	3	67	7
ARME			40	2	85	14	75	14	53	11	8	20	83	9
PIPO			40	14	69	10	13	3	7	3			17	1
QUKE			20	1	69	4	13	1					17	1
QUSA			20	8					13	8	46	22	17	30
PREM			20	1										
ACMA					8	3	13	3	27	15				
QUVA					8	15			7	1				

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RHMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
LIDE3							13	T	27	14	62	8	100	19
TABR							25	2	27	6	8	1	17	5
ACGL							25	1						
PIAT							13	1						
ACCI									7	50				
ALRU									7	1				
ABMAS									7	1				
CHLA											15	4		
UMCA											8	40		
ALSI											8	15		
QUGA														
PICO														
TOTALU	100	44	100	61	100	99	100	48	100	69	100	51	100	97
SHRUBS:														
ROGY	20	1	60	4	92	3	100	5	100	2	31	4	100	5
CHUM	40	1	40	2	54	3	25	2	80	4	38	2	33	3
SYMO	20	1	80	16	54	2	88	4	73	2			17	2
HODI	60	3	80	6	31	3	88	5	13	2	8	5	17	2
WIMO	20	8	60	6	8	1	25	14	40	4			50	7
BENE	20	3			23	4	100	29	100	13	77	12	83	8
AMPA	40	1	60	3	38	1	13	1	40	1	15	4		
ARPA	20	20	20	20	15	3			7	1				
ARNE	20	50	20	3	8	8								
CEPR	20	3												
GABU	20	20												
RISA	20	1												
RUUR			40	2	38	6	63	4	87	2	38	1	33	1
CHME			20	1	8	1	25	1	47	1	23	1	50	1
BEPI			40	6	54	5	75	3					17	2
BERE			20	1	8	1	13	3	7	1				
PAMY			20	1			13	1	20	3			17	1
GAFR			20	1					7	1				
CEVE			20	1										
RIVI			20	8										

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RHMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):														
COCOC					23	2	50	4	40	4	8	4	17	35
CONU					8	8	38	8	27	5	8	3	33	5
VAPA					8	2	13	1	20	5	38	4	33	3
RUPA					15	1	38	1	33	3				
RHDI					31	2	38	7						
CEIN					15	2	13	1						
ARVI					8	1			7	1				
LOHI					31	1					8	2	33	2
RHCA					8	5							17	3
CEMO					8	1								
SALIX					8	3								
PHLE2							13	1	7	3				
GASH									7	85	92	49	100	37
RHMA									7	3	100	67		
BEAQ									13	2				
SYAL									20	2				
LOCO									7	3				
VAME									7	8				
VAOV2											8	70		
RHPU											8	5		
LOCI														
RILA														
RILO														
CECU														
GAOV														
VASC														
OECE														
RULE														
ARCI														
ARCO3														
CESA														
RUBUS														
VICA3														
BEPU														
JUCO4														
RHOC														
SPDO														
TOTALS	100	24	100	36	100	17	100	60	100	38	100	134	100	65

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RIMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:														
GOOB	20	1	40	1	46	1	88	1	93	1	54	1	50	2
POMU	20	1	40	6	8	1	63	2	33	3	8	5	50	3
TRLA2	20	1	80	1	31	1	88	2	53	4	8	1	17	1
HIAL	20	1	60	2	69	2	63	1	33	3			17	2
ARMA3	40	1	40	1	15	1	13	3	13	2				
VIAM	20	1	60	10	54	1	13	1						
ACMI	60	2	40	26	15	1								
LUAL	20	8	20	3	15	12								
CATO	20	1	20	1										
CAPU	40	2	20	1										
SESP	20	1	20	3										
IRCH	40	1			62	1	25	2	33	1	8	1	17	1
XETE	60	10			15	26	50	4	27	21	69	5	33	1
SYRE	20	3			15	2	38	1	27	1				
CAPR3	40	1			23	1	25	2						
GAAM	40	5			15	1	13	1					17	1
ERLA	20	1			15	1								
MOOD	20	3			8	1								
ERHE2	20	3					13	1						
ERAL	20	1							7	1				
LOMAT	20	1												
EPMI	20	1												
SEOR2	20	1												
SICA2	20	1												
ERUM	20	1												
GAOR	40	1												
CRSI	20	8												
SELAL	20	1												
VICU	20	3												
CRPL	20	8												
ORCU	20	1												
PEPA3	20	1												
PHSP	20	1												
THFE	20	1												
VIPU	20	1												

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RIMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
PTAQ			20	8	46	3	50	2	67	3	54	3	67	3
COMA3			20	1	8	1	13	1	20	1	8	2		
ADBI			20	3	8	1	63	2	47	1			17	1
GAAP			40	1	23	1	63	11	33	1				
FRVEB			80	19	69	2	13	1	7	0				
PHAD			20	1	23	1	13	1	33	2				
ARLA			20	1	15	1			13	1				
SADO			20	3	8	1	13	1						
CAAP2			20	1	15	2								
VAHE			20	1			38	6	33	2	15	6	17	1
ACRU			20	1			25	3	7	1				
PTAN			20	1			13	1						
LIWA			20	1					7	1				
COHE			20	1										
IRTEK			20	1										
MOPA			20	1										
ORFA2			20	1										
SEIN			20	1										
LIBOL					15	2	25	30	53	14	31	3	33	35
ACTR					8	2	50	22	47	3	46	5	33	2
DIHOO					46	1	88	1	73	1	15	3	33	1
LAPO					23	2	13	1	7	3	8	1		
APAN					69	2	13	8	20	1			67	2
CASC2					8	1	13	1	27	2			17	3
OSCH					38	1	13	3	7	3				
MAMA					38	1	13	1						
NEHE					8	1	13	1						
PYPI					23	1			47	2			17	1
PYDE					38	2			7	1				
CYGR					8	1			7	1				
SASA2					8	1			13	1				
ASBR					23	1								
LATHY					8	1								
BRODI					15	1								
HAEL					23	1								

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RHMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
LULE					23	34								
POGR					8	1								
ANMA					8	1								
HIGR2					8	1								
TRIFO					8	1								
TROV							38	1	20	1	15	1		
SMRA							50	2	7	1				
ANDE							38	3	53	2				
ANLY2							13	2	7	1				
MITR2							25	1	13	1				
ASCA3							13	2			8	3		
BOST2							25	2						
MOSI							13	1						
GABI							13	1						
VIOR2									7	1	8	1	33	1
SMST									20	3	8	2	33	1
COST2									7	1	8	1		
PYAS									7	1	8	2		
DISM									7	1	15	1		
PHOE2									7	1			17	1
HAUN									7	1			17	1
EBAU									7	1			17	1
VIGL									7	1				
VIOLA									7	1				
CLUN									40	1				
PYSE									20	2				
LICO3									13	1				
VECA									7	1				
SETR									7	1				
ARCO									7	3				
LOTUS									7	3				
SEBO									7	3				
GABO									7	1				
OXOR									7	1				
VECU									7	1				

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RHMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
HECO											8	1	17	1
MOHY											15	1	17	1
LICA3											8	1		
PSPH											15	1		
COLA											8	1		
CORAL											8	1		
VISA														
HEMI														
MOPE														
AQFO														
LOMI														
COGR														
VICIA														
POLYS														
ARPA3														
HYMO														
LUPOP														
CABU2														
POCA8														
ASHA														
HADI2														
SEPU2														
COMPO														
HYPE														
ASDE														
UMBEL														
DIFO														
ERHO2														
GATR														
ARPL														
TITR														
STHO														
ARDI														
CLRH														
BORAG														

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RHMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
<u>HERBS</u> (Cont):														
ACUR														
FRAGA														
AGGR														
ALVI														
CLPU2														
MOUN2														
ORPU														
ERIOG														
ERVI														
PHHEP														
GICA														
PEDE														
AROR														
POGL														
BAMI														
ASCO														
CLGR														
CORA2														
LUPIN														
PLNO														
DRDI														
SAXIF														
HOSE														
COPO														
PENO														
TOTE														
BADE														
LIPA														
LOTR														
RAOC														
SELI														
TRLO														
TRRI														
ANAPH														
EPILO														
<u>TOTALH</u>	100	21	100	43	100	28	100	48	100	32	100	12	100	21

TABLE 13 (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-ABCO-PIJE		PSME-ABCO		PSME-ABCO-PIPO		PSME-ABCO/HODI		PSME-ABCO/BENE		PSME-RIMA		PSME-LIDE3/GASH	
Number of Samples	5		5		13		8		15		13		6	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES:														
FERU	20	95			8	1							17	1
POA	20	20			8	1								
CAREX	40	1									8	1		
SIHY	20	1												
BROMU			20	1										
AREL			20	1										
PHALA			20	1										
TRISE			20	1										
BRCA					46	12	25	1	13	1				
FESU					15	1	13	4						
ELGL					8	3								
FESTU					8	1								
CAPE5					8	1								
KOCR					8	1								
MESU									7	8				
FEOC									13	1				
DECA														
MELIC														
CYEC														
POSA3														
AGROS														
DACA														
GAVE2														
STOCM														
TOTALG	100	24	100	1	100	6	100	1	100	1	100	T	100	T

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:														
ELEV	100	3174	100	2204	100	3071	100	2489	100	3675	100	4548	100	3050
ASPECT	100	189	100	186	100	291	100	359	100	359	100	231	100	350
SLOPE	100	47	100	51	100	42	100	47	100	30	100	45	100	49
TODPTH	100	29	100	28	100	41	100	33	100	30	30	46	100	41
TOTDA	100	206	100	245	100	340	100	264	100	300	100	277	100	307
TREE OVERSTORY:														
PIJE							7	8						
PIMO														
PSME	100	48	100	44	100	69	100	52	100	50	100	55	100	78
PILA	86	11	69	20	20	7	20	14	50	1			11	3
CADE3			6	10	10	20	27	13					11	8
ABCO							7	8					22	4
PIPO	14	5	50	16	30	7	20	22			50	10	11	1
TSHE														
ABMAS														
CHLA							13	1	50	20				
PIAT														
PICO														
TOTALO	100	59	100	66	100	75	100	64	100	61	100	60	100	81
TREE UNDERSTORY:														
PIJE							7	3						
PIMO					10	1								
PSME	100	41	100	25	100	19	100	30	100	29	83	16	89	50
QUCH	86	11	63	10	50	8	80	17					67	10
ABCO					20	3	7	1			17	8		
CADE3			19	2	10	80	40	12					22	3
CACH	100	14	6	20	30	4			100	12	33	2	11	3
PILA	100	6	93	5										
ARME	86	17	81	11	30	14	87	7	50	8	100	12	89	4
PIPO	14	8	13	4							17	3	11	1
QUKE			75	11			7	42			17	1	56	4
QUSA	14	30			10	20			100	11				
PREM														
ACMA			6	12	20	11	20	5					56	19
QUVA							7	1						

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):														
LIDE3	100	21	100	11	100	11	100	14						
TABR	14	1			30	6	27	6					22	12
ACGL											17	1		
PIAT														
ACCI					30	9								
ALRU														
ABMAS														
CHLA							13	1	50	3				
UMCA							7	1						
ALSI														
QUGA											17	1		
PICO														
TOTALU	100	111	100	67	100	57	100	75	100	57	100	29	100	71
SHRUBS:														
ROGY	29	2	75	2	30	3	60	2	100	2	67	4	100	4
CHUM	71	8	6	5	30	5	13	2	100	12	33	1		
SYMO			31	3	70	14	40	2	50	3	67	8	78	7
HODI					30	2	20	4			100	14	89	13
WHMO	29	6	25	9	40	7	40	4					78	19
BENE	57	10			70	17	20	13	100	6	50	14	100	18
AMPA							7	1					67	2
ARPA	14	10	6	5			13	2						
ARNE														
CEPR			6	5										
GABU														
RISA														
RUUR	29	2	13	2	30	3	47	1	100	2			56	4
CHME	43	1	31	1	20	1	27	1	50	1				
BEPI			6	8	40	4	7	2					89	7
BERE											100	20		
PAMY									50	3	17	1		
GAFR														
CEVE														
RIVI														

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):														
COCOC	14	2	19	24	30	17	47	5					100	6
CONU			19	3	40	6	20	6	50	3	33	1	56	17
VAPA					10	1			100	3				
RUPA					10	1	7	1			17	1	44	2
RHDI			100	12			93	10					56	4
CEIN			13	2									22	1
ARVI			13	5										
LOHI			69	3	10	1	33	5					67	3
RHCA			6	4			7	1						
CEMO														
SALIX														
PHLE2													44	6
GASH														
RHMA									100	2				
BEAQ			6	20	20	5	13	2						
SYAL											50	24	11	1
LOCO											17	1		
VAME									50	3				
VAOV2							7	10						
RHPU													11	1
LOCI			6	3	10	0	13	1					22	6
RILA			6	1										
RILO					10	1								
CECU							7	1						
GAOV									50	3				
VASC									50	3				
OECE											17	8		
RHLE													33	2
ARCI														
ARCO3														
CESA														
RUBUS														
VICA3														
BEPU														
JUCO4														
RHOC														
SPDO														
TOTALS	100	16	100	28	100	38	100	25	100	36	100	63	100	90

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:														
GOOB	29	1	13	1	03	1	80	1	100	6	50	1	100	1
POMU	29	2	31	9	50	4	80	9			33	2	67	2
TRLA2			6	1	60	2	60	3			100	3	100	3
HIAL	29	1	88	2	50	1	13	3			50	2	78	1
ARMA3	14	1	13	2	10	3	20	1			83	5		
VIAM			19	1	10	3					17	50	11	1
ACMI			6	1										
LUAL														
CATO			6	1			7	1			17	1		
CAPU					20	1	33	1						
SESP							7	1						
IRCH			25	1	10	1	40	1	50	1			33	1
XETE							7	3					11	3
SYRE					50	1	27	3					33	3
CAPR3			44	1	10	1	7	1					67	1
GAAM			19	1			20	1						
ERLA														
MOOD														
ERHE2			13	1			13	1						
ERAL							7	1						
LOMAT			6	2										
EPMI							7	1						
SEOR2							7	1						
SICA2														
ERUM														
GAOR														
CRSI														
SELAL														
VICU														
CRPL														
ORCU														
PEPA3														
PHSP														
THFE														
VIPU														

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
PTAQ	43	2	81	5	20	12	20	3	50	3	17	1	22	1
COMA3	29	1	6	1	30	1	7	1			17	1	22	1
ADBI			25	6	30	6	33	3					89	2
GAAP	14	1	31	2	30	1	33	1			67	13	67	1
FRVEB			13	2	10	1					33	2	44	2
PHAD			19	1			7	1					44	1
ARLA			6	3									11	3
SADO							7	8						
CAAP2														
VAHE					30	1	27	2			33	1	22	1
ACRU											50	2		
PTAN			6	1			7	1						
LIWA														
COHE			44	1										
IRTEK														
MOPA														
ORFA2														
SEIN														
LIBOL	14	1			30	30	20	2	100	3			11	1
ACTR	29	1	13	5	40	14	40	4	100	5			11	3
DIHOO			19	1	40	2	33	1	50	T	33	5	100	3
LAPO			19	8									44	2
APAN			56	2			13	2					22	5
CASC2			19	1	20	2	13	2						
OSCH			50	6	10	4	13	3					11	1
MAMA			56	2			13	3			33	5	1	1
NEHE			6	1							17	1	11	1
PYPI	43	1	6	1	60	2	7	1	50	3				
PYDE	57	2	13	3										
CYGR			13	1			7	1						
SASA2														
ASBR			6	1			7	1						
LATHY					10	1	7	1						
BRODI														
HAEL														

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
LULE														
POGR														
ANMA														
HIGR2														
TRIFO														
TROV					20	1					17	1	22	1
SMRA					30	1	20	2			33	1	33	3
ANDE					10	1							11	1
ANLY2					10	1								
MITR2											33	1		
ASCA3							7	1						
BOST2	57	1	6	1			13	1						
MOSI			6	2			13	1			33	8		
GABI														
VIOR2	14	1			10	1	7	1						
SMST							7	1	50	0	17	1	33	5
COST2	29	1	6	1	10	1	13	1						
PYAS			13	1	10	1	7	1	50	3				
DISM														
PHOE2							20	1					22	1
HAUN							7	1						
EBAU											17	1	11	1
VIGL			6	1	10	1								
VIOLA					10	1			100	1			11	3
CLUN									100	3				
PYSE									50	3				
LICO3									50	1				
VECA														
SETR														
ARCO														
LOTUS														
SEBO														
GABO														
OXOR														
VECU														

TABLE 13a CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
HECO	14	1												
MOHY														
LICA3	14	1	13	1			13	1						
PSPH			6	1										
COLA														
CORAL														
VISA			6	8	10	3								
HEMI			6	2			13	2						
MOPE			6	1							17	1		
AQFO			6	1										
LOMI			6	1										
COGR			13	1										
VICIA			6	4										
POLYS			6	2										
ARPA3			6	1										
HYMO			6	1										
LUPOP			6	1										
CABU2					20	1	7	1					11	1
POCA8					10	3	7	3						
ASHA					20	1	13	2						
HADI2					10	1								
SEPU2							7	1						
COMPO							7	1						
HUPE							7	1						
ASDE							7	1						
UMBEL							7	1						
DIFO							7	1						
ERHO2							7	1						
GATR							7	1						
ARPL							7	T						
TITR									50	3				
SIHO											33	1		
ARDI														
CLRH														
BORAG														

TABLE 13a CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):														
ACUR														
FRAGA														
AGGR														
ALVI														
CLPU2														
MOUN2														
ORPU														
ERIOG														
ERVI														
PIHEP														
GICA														
PEDE														
AROR														
POGL														
BAMI														
ASCO														
CLGR														
CORA2														
LUPIN														
PLNO														
ORDI														
SAXIF														
HOSE														
COPO														
PEHO														
TOTE														
BADE														
LIPA														
LOTR														
RAOC														
SELI														
TRLO														
TRRI														
ANAPH														
EPILO														
TOTAL H	100	6	100	25	100	31	100	23	100	26	100	36	100	24

TABLE 13a: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME-LIDE3-PILA		PSME-LIDE3-RHDI		PSME-LIDE3		PSME-LIDE3-QUCH		PSME-QUSA		PSME/BERE		PSME/BENE	
Number of Samples	7		16		10		15		2		6		9	
	Cons[1]	Mean[2]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES:														
FERU	14	1	19	2	10	1	20	28						
POA							7	1						
CAREX							13	1	50	T				
SIHY														
BROMU			6	2			7	T						
AREL			6	1										
PHALA														
TRISE														
BRCA													56	1
FESU			50	15	50	3	13	6	50	T			11	0
ELGL							7	6						
FESTU														
CAPE5														
KOCR														
MESU					10	1	7	T						
FEOC							7	1						
DECA			13	1										
MELIC			6	1										
CYEC							7	15						
POSA3							7	1						
AGROS														
DACA														
GAVE2														
STOCM														
TOTALG	100	T	100	8	100	2	100	8	100	0	100	0	100	1

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur.
A mean of 'T' indicates that the value is less than 1 percent.

TABLE 13b: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:										
ELEV	100	2947	100	1988	100	4040	100	3509	100	3016
ASPECT	100	217	100	134	100	246	100	230	100	306
SLOPE	100	49	100	50	100	48	100	49	100	29
TODPTH	100	37	100	29	100	36	100	34	88	19
TOTBA	100	260	100	170	100	200	100	115	100	136
TREE OVERSTORY:										
PIJE									100	16
PIMO									13	18
PSME	92	58	85	34	25	3	100	19	75	21
PILA	17	27	31	12	25	20	23	5	38	8
CADE3	8	3			25	8	8	1	63	8
ABCO							8	1		
PIPO	75	13	38	20	75	50	54	15		
TSHE										
ABMAS										
CHLA									25	9
PIAT			8	5			8	3		
PICO									13	10
TOTALO	100	68	100	41	100	45	100	28	100	45
TREE UNDERSTORY:										
PIJE									63	5
PIMO									38	11
PSME	100	26	85	24	75	70	85	21	100	12
QUCH	50	34	77	22	100	6	15	45	38	1
ABCO							8	3		
CADE3	8	1	8	1	25	8	8	5	63	6
CACH							23	30		
PILA	25	3	15	3	50	6	23	4	38	4
ARME	75	16	92	12	75	40	54	8	38	4
PIPO	25	5	38	3	75	22	38	9		
QUKE	67	16	54	22	25	3	54	3	13	1
QUSA										
PREM					50	2				
ACMA	17	6	8	25			8	20		
QUVA									50	20

TABLE 13b: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):										
LIDE3									38	5
TABR										
ACGL			8	1						
PIAT									13	2
ACCI			8	5			8	99		
ALRU							8	20		
ABMAS										
CHLA									38	6
UMCA			8	1			8	1	25	16
ALSI										
QUGA			8	8			8	3		
PICO										
TOTALU	100	70	100	65	100	112	100	54	100	45
SHRUBS:										
ROGY	42	1			75	2	23	7	38	2
CHUM							15	4	13	1
SYMO	58	10	31	12	75	4	38	3		
HODI	42	2					31	5		
WIMO	58	5					23	7	25	16
BENE										
AMPA	33	2	8	1	50	1	23	2	38	4
ARPA			8	3	25	20	23	23	13	3
ARNE							8	7	38	6
CEPR									25	4
GABU	33	2							38	17
RISA										
RUUR	25	1					15	3		
CIME	8	1					8	1		
BEPI	100	4			100	2				
BERE										
PAMY							8	1		
GAFR	17	2								
CEVE	8	1					8	8		
RIVI										

TABLE 13b: CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):										
COCOC	25	4	8	1						
CONU	8	8	8	1			23	6		
VAPA									38	2
RUPA										
RHDI	100	22	100	19					25	2
CEIN	17	1	8	5	75	10	31	25	13	1
ARVI	8	1	8	15			31	32	38	24
LOHI	33	4	54	7			23	2	13	3
RHCA	8	1							25	7
CEMO	8	1			25	8				
SALIX										
PHLE2	25	2								
GASH										
RIMA										
BEAQ									13	3
SYAL										
LOCO							8	1		
VAME										
VAOV2										
RHPU										
LOCI	33	8	8	3						
RILA										
RILO										
CECU					25	1				
GAOV										
VASC										
OECE										
RULE	8	1			25	50				
ARCI	8	1			50	12				
ARCO3	8	4								
CESA			8	8						
RUBUS			8	3						
VICA3			8	2						
BEPU									25	1
JUCO4									38	6
RHOC									13	40
SPDO									25	5
TOTALS	100	46	100	30	100	40	100	33	100	37

TABLE 13b (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BLPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJL	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:										
GOOB	42	1					15	1		
POMU	42	1	38	8			15	15	38	2
TRLA2	33	2	8	7			38	2	13	4
HIAL	42	2	46	1	25	1	23	1	13	1
ARMA3			15	2			23	2		
VIAM	25	10	15	1	50	1	23	2	13	1
ACMI	8	4			25	1	8	1	13	1
LUAL					100	6				
CATO							8	1		
CAPU									13	3
SESP	8	1	8	25						
IRCH	42	1			75	1	8	1	38	4
XETE			15	11	50	5			63	11
SYRE	25	2	8	10					13	1
CAPR3	8	1			25	1			13	1
GAAM									25	6
ERLA					25	1	8	8	13	3
MOOD					25	8	8	1		
ERHE2										
ERAL										
LOMAT			15	1					25	3
EPMI										
SEOR2									13	2
SICA2			8	3			8	3		
ERUM					25	1				
GAOR							31	1		
CRSI							15	4		
SEIAL									13	1
VICU									13	1
CRPL										
ORCU										
PEPA3										
PHSP										
THFE										
VIPU										

TABLE 13b (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:										
PTAQ	8	1	31	14			8	1		
COMA3	17	1			25	1				
ADBI	17	2			25	1	8	1		
GAAP	25	1	15	2			38	5	13	3
FRVEB	42	3			50	5	8	1		
PHAD	8	3			50	1			13	1
ARLA	8	1	8	3			8	1	13	1
SADO										
CAAP2							8	1		
VAHE							8	1		
ACRU							8	1		
PTAN										
LIWA										
COHE			15	1					13	1
IRTEK			8	1						
MOPA										
ORFA2										
SEIN										
LIBOL										
ACTR			8	5						
DIHOO	33	1			25	1	23	1	25	1
LAPO	17	5			25	1				
APAN	33	4			75	3				
CASC2										
OSCH	25	1			25	1	8	1		
MAMA	33	1	23	1	50	1	46	3		
NEHE	8	1	15	2			8	1		
PYPI							8	1		
PYDE			8	1	25	1			13	1
CYGR	17	1							13	8
SASA2							8	1		
ASBR			8	1	25	1			13	1
LATHY			8	1					13	1
BRODI	17	1	8	2	25	1	15	1	13	1
HAEL	8	1			50	1				

TABLE 13b (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:										
LULE							23	2	13	8
POGR							8	1		
AHMA										
HIGR2										
TRIFO										
TROV										
SMRA	8	1	8	1			8	1	13	1
ANDE	8	1								
ANLY2										
MITR2							15	1		
ASCA3										
BOST2	17	1	8	8						
MOSI							23	1	13	3
GABI										
VIOR2										
SMST	8	1					8	45	13	1
COST2	8	1					8	1		
PYAS	8	1								
DISM										
PHOE2	17	1	15	1			8	1		
HAUN	17	1								
EBAU										
VIGL							15	1		
VIOLA										
CLUN										
PYSE										
LICO3										
VECA									13	1
SETR							8	1		
ARCO									13	1
LOTUS										
SEBO										
GABO										
OXOR										
VECU										

TABLE 13b (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:										
HECO										
MOHY										
LICA3										
PSPH										
COLA										
CORAL										
VISA										
HEMI										
MOPE			8	1					13	1
AQFO	17	1							13	5
LOMI			8	1						
COGR							8	1		
VICIA										
POLYS										
ARPA3										
HYMO										
LUPOP										
CABU2									13	3
POCA8			23	1						
ASHA										
HADI2			8	1						
SEPU2			8	40						
COMPO			15	1						
HYPE			15	1						
ASDE									13	1
UMBEL									13	1
DIFO										
ERHO2										
GATR										
ARPL										
TITR										
SIHO	8	1								
ARDI	8	1								
CLRH			8	8			31	14		
BORAG			23	6						

TABLE 13b (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons[1/]	Mean[2/]	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS:										
ACUR			8	3						
FRAGA			8	3						
AGGR			8	2						
ALVI			8	1						
CLPU2			8	1						
MOHN2			8	1						
ORPU					25	3			13	80
ERIOG					25	1				
ERVI					25	1				
PHHEP					25	3				
GICA							15	2		
PEDE							8	8		
AROR										
POGL										
BAMI							15	2		
ASCO							15	1		
CLGR							15	1		
CORA2							15	1		
LUPIN							8	3		
PLNO							8	3		
DRDI							8	1		
SAXIF							8	1		
HOSE									25	4
COPO									25	3
PEHO									13	20
TOTE									13	3
BADE									13	1
LIPA									13	1
LOTR									13	1
RAOC									13	1
SELI									13	1
TRLO									13	1
TRRI									13	1
ANAPH										
EPILO										
TOTALH	100	13	100	23	100	23	100	22	100	35

TABLE 13b (Cont): CONSTANCY TABLE FOR DOUGLAS-FIR ASSOCIATIONS

	PSME/RHDI-BEPI		PSME/RHDI		PSME-PIPO		PSME/Depauperate		PSME/PIJE	
Number of Samples	12		13		4		13		8	
	Cons 1/	Mean 2/	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
GRASSES:										
FERU			8	1						
POA	8	30							13	65
CAREX			8	3	25	1			50	3
SIHY					25	1			13	1
BROMU			15	12	25	3				
AREL										
PHALA										
TRISE										
BRCA	25	1	8	8	75	14				
FESU	33	1	8	1			8	4		
ELGL	17	2	23	7						
FESTU			8	3			15	3	13	8
CAPE5										
KOCR										
MESU										
FEOC										
DECA										
MELIC										
CYEC			31	30						
POSA3									13	40
AGROS			31	15					13	3
DACA			8	3					13	4
GAVE2			8	3						
STOCM					25	95				
TOTALG	100	3	100	19	100	36	100	1	100	18

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE PONDEROSA PINE SERIES

The Species

Ponderosa pine (Pinus ponderosa) is a widely occurring species in the Western United States. It is common in areas with low summer rainfall and is generally tolerant of moisture stress. It usually behaves as a fast growing, seral species, not often playing the role of climax dominant; its behavior is similar in the Siskiyous. Although tree overstory occurrences number 15 percent, or 145 of the plots, they only occur in the regeneration layer in 6 percent of the plots. Ponderosa pine regeneration is stimulated by fire, and controlling fires restricts regeneration.

Most of the ponderosa pine occurrences are in the Douglas-fir Series (45 percent of the plots) and the White Fir Series (38 percent); the Tanoak Series is a distant third (14 percent). As expected, the greatest amount of ponderosa pine is in hot, dry environments. Of all the ponderosa pine regeneration, 66 percent is found in the Douglas-fir Series and only 25 percent is in the White Fir Series.

The average elevation for the species is 3800 feet. It has a wide elevational range and occurs above 5000 feet if there is a seed source available after a burn. It tends to occupy south aspects; they are burned most often. The average aspect is 190 degrees. Absolute cover does not correlate with aspect, and slope is related to neither cover nor occurrence.

The average slope for the species is 40 percent. The total soil depth for the species averages 35 inches, only one inch less than the Siskiyou average.

The Series

The Series is dominated by ponderosa pine but has many associates: Douglas-fir (Pseudotsuga menziesii), sugar pine (Pinus lambertiana), and incense-cedar (Libocedrus decurrens) are commonly found in the overstory. Many oaks and other hardwoods are found in the understory. Creeping snowberry (Symphoricarpus mollis) and western serviceberry (Amelanchier alnifolia) are common shrubs usually found with high cover. Grasses are common, averaging 21 percent cover. The average total soil depth for the series is quite different than that of the species: 28 inches; the difference may be a result of the species' ability to invade almost any site after fire, and its inability to maintain itself when competing with other species on deeper soils.

Ponderosa Pine Associations

*Keyed with Douglas-fir Series.

PONDEROSA PINE - DOUGLAS-FIR
PIPO-PSME N = 4

EXTENT: Applegate and Ashland Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	4558	389	4190-5100	Metavolcanic, schist, granodiorite, and peridotite on upper 1/3 slope positions, mostly convexities. Litter cover is 62%, moss 1%, bareground 8%, and rock 20%.
Aspect (deg)	212	48	SE-W	
Slope (%)	57	8	46-65	
Soil Depth (in)	28	11	14-40	
Total BA (ft^2)	170	123	20-320	

VEGETATION: (See page 259 for complete table) (Keyed in Douglas-fir Series)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
ponderosa pine (PIPO)	35	100	Climax to coclimax
sugar pine (PILA)	16	75	Seral
Tree Understory			
ponderosa pine (PIPO)	28	100	Good growth
Douglas-fir (PSME)	9	75	Fair growth
white fir (ABCO)	2	75	Poor growth
Shrub, Herb & Grass			
all shrubs	65	100	

DISCUSSION: This Association represents the only sites that are climax to ponderosa pine. There are other climax ponderosa sites in southwestern Oregon but the vast majority is not administered by the Forest Service. Because this Association is the only association in the Ponderosa Pine Series it is keyed with the Douglas-fir Series, its closest kin. Ponderosa pine, Douglas-fir, sugar pine, white fir (*Abies concolor*), and incense-cedar all occur here, but ponderosa pine is the most efficient. Only the hardiest sugar pine and white fir can survive on these sites and their growth rate is slow. Deerbrush ceanothus (*Ceanothus integerrimus*) and grass, as in the PSME-PIPO Association, will be competitive with the crop trees.

TABLE 14: CONSTANCY TABLE FOR PONDEROSA PINE ASSOCIATIONS

	PIPO-PSME	
Number of Samples	4	
	Cons[1/] (%)	Mean[2/] (%)
ENVIRONMENT:		
ELEV	100	4558
ASPECT	100	212
SLOPE	100	57
TODPTH	100	28
TOTBA	100	170
TREE OVERSTORY:		
PIPO	100	35
PILA	75	16
PSME	50	12
CADE3	25	20
TOTALO	100	58
TREE UNDERSTORY:		
PIPO	100	28
PSME	75	9
ABCO	75	2
CADE3	50	44
PILA	50	14
CACH	50	6
QUVA	25	80
QUSA	25	8
QUCH	25	3
QUKE	25	3
TOTALU	100	91

TABLE 14 (Cont): CONSTANCY TABLE FOR PONDEROSA PINE ASSOCIATIONS

PIPO-PSME

Number of Samples	4	
	Cons	Mean
SHRUBS:		
ARNE	50	44
ARPA	50	5
WHMO	50	3
HODI	50	2
SYMO	25	80
BEPI	25	20
CEVE	25	8
CHUM	25	8
GABU	25	8
RHDI	25	8
BENE	25	3
CEIN	25	3
CEMO	25	3
CESA	25	3
LOHI	25	3
AMPA	25	1
PAMY	25	1
ROGY	25	1
RUPA	25	1
SALIX	25	1
TOTALS	100	65

TABLE 14 (Cont): CONSTANCY TABLE FOR PONDEROSA PINE ASSOCIATIONS

	PIPO-PSME	
Number of Samples	4	
	Cons	Mean
HERBS:		
LUAL	50	6
APAN	50	2
ARMA3	50	2
ERLA	50	2
PYDE	50	2
ERIOG	25	8
GAOR	25	3
LATHY	25	3
NEHE	25	3
PTAQ	25	3
TRLA2	25	3
VIAM	25	3
ACMI	25	1
AROR	25	1
CASC2	25	1
CLRH	25	1
SEOR2	25	1
FRVEB	25	1
GICA	25	1
HIAL	25	1
IRCH	25	1
IRTEK	25	1
LULE	25	1
ORPU	25	1
PEDE	25	1

TABLE 14 (Cont): CONSTANCY TABLE FOR PONDEROSA PINE ASSOCIATIONS

PIPO-PSME

Number of Samples	4	
	Cons	Mean
HERBS (Cont):		
POGL	25	1
POMU	25	1
SICA2	25	1
VECA	25	1
TOTALH	100	19
GRASSES:		
STOCM	25	80
POA	25	3
BRCA	25	1
ELGL	25	1
TOTALG	100	21

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE JEFFREY PINE SERIES

The Species

Although Jeffrey pine (*Pinus jeffreyi*) is common in the Sierran forests, it is confined to scattered outcrops of peridotite and serpentine in the Siskiyou Mountains, the northernmost extent of its range. Jeffrey pine is climax on many of these sites but gradually loses its competitive ability westward as moisture conditions in the soil and atmosphere reduce the negative effects of the chemically imbalanced parent materials. Near the coast tanoak (*Lithocarpus densiflorus*), western hemlock (*Tsuga heterophylla*), or Port-Orford-cedar (*Chamaecyparis lawsoniana*) may dominate ultrabasic sites, even though Jeffrey pine is present.

The Series

The Series is divided into five associations; all have the physical properties characteristic of serpentine/peridotite derived soils. They are both clayey and shallow, and are high in magnesium relative to calcium and in toxic heavy metals such as nickel and chromium.

Consequently they are the least productive forested associations in the Siskiyou Mountains. The average mean annual increment (MAI) is approximately 13 cubic feet per acre per year. Comparatively, average Siskiyou National Forest sites produce more than 100 cubic feet per acre annually.

The Series is floristically diverse, supporting many sensitive species; and structurally diverse, providing important animal habitat. Many of the southern aspects are prime winter range. Some of the most important bird and mammal habitat is at the interface between Jeffrey pine associations and more "normal" forested associations.

Jeffrey Pine Associations

Key to the Jeffrey Pine Associations

1a	Western white pine present	PIJE-PIMO (p267)
1b	Western white pine absent	2
2a	Douglas-fir and/or huckleberry oak present	PIJE-QUVA (p268)
2b	Douglas-fir and huckleberry oak absent	3
3a	Squawcarpet ceanothus present with high total herb cover	PIJE/CEPU (p269)
3b	Squawcarpet ceanothus absent or less than 5% total herb cover, and grass dominant	4
4a	Below 4500 feet elevation	PIJE/Grass (p270)
4b	Above 4500 feet elevation	*PIJE/FEID (p271)

*PIJE/FEID is a phase of the PIJE/grass Association and occurs in the eastern Siskiyou Mountians.

JEFFREY PINE SERIES SUMMARY
PIJE N = 39

EXTENT: Ultrabasic soils.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3214	1532	1180-6490
Aspect (deg)	202	57	All
Slope (%)	29	17	1-70
Soil Depth (in)	18	9	6-40
Total BA (ft²)	83	76	5-320

GENERAL DESCRIPTION

All topographic positions on ultrabasic parent materials. Litter averages 63% and moss, bareground, and surface rock average 2, 15, and 41 percent respectively.

VEGETATION: (See page 272 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
incense-cedar (CADE3)	5	44	Often coclimax with PIJE
Jeffrey pine (PIJE)	18	95	The climax dominant
western white pine (PIMO)	4	15	Cold sites and high elevation
Douglas-fir (PSME)	4	36	On less severe ultrabasic sites
white fir (ABCO)	0	0	Rarely on ultrabasics and not where PIJE is climax
Tree Understory			
Jeffrey pine (PIJE)	8	95	Restricted to ultrabasics
western white pine (PIMO)	9	23	Fair growth for the series
Douglas-fir (PSME)	4	49	Can plant on less severe sites
Port-Orford-cedar (CHLA)	3	8	Coastal or drainages
California laurel (UMCA)	10	26	High humidity sites
incense-cedar (CADE3)	8	62	Minor climax
Shrub, Herb & Grass			
pinemat manzanita (ARNE)	18	31	Good erosion control potential
whiteleaf manzanita (ARVI)	14	54	Also occurs on hot dry disturbed sites
common yarrow (ACMI)	3	36	Usually indicates disturbance
grasses	39	100	Usually *POA*, *FESTUCA*, or *BROMUS*

JEFFREY PINE - WESTERN WHITE PINE
PIJE-PIMO N = 9

EXTENT: Mostly Illinois Valley and Ashland, Applegate, Gold Beach, and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	4276	1267	2220-6140	Occurs on all slope positions with 46% surface rock. Soils are clayey and sticky. It lacks surface moss. There is little to no evidence of fire. On ultrabasic parent rock usually high elevations.
Aspect (deg)	81	117	16-355	
Slope (%)	27	17	1-51	
Soil Depth (in)	21	8	6-32	
Total BA (ft^2)	92	66	40-260	

VEGETATION: (See page 272 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Jeffrey pine (PIJE)	19	89	Climax dominant, good growth
incense-cedar (CADE3)	5	78	Seral to coclimax
western white pine (PIMO)	4	67	Seral, good early growth
Douglas-fir (PSME)	3	44	Seral, fair survival and growth
Tree Understory			
Jeffrey pine (PIJE)	17	100	Most appropriate regeneration species
western white pine (PIMO)	9	100	Productivity good where blister rust absent
Douglas-fir (PSME)	6	89	Productivity fair
Port-Orford-cedar (CHLA)	3	22	Cutbank and fill slope stabilizer
Shrub, Herb & Grass			
pinemat manzanita (ARNE)	17	78	Cutbank and fill slope stabilizer

DISCUSSION: This is the most productive and versatile association in the Jeffrey Pine Series. Even white fir (*Abies concolor*) occurs occasionally. Ultrabasic rock limits productivity and reforestation will be difficult. All species listed in the "understory" above are appropriate choices for regeneration. Western serviceberry (*Amelanchier alnifolia*) and forbs provide forage for ungulates. A diverse vertical structure and horizontal pattern provides habitat for birds and mammals. This diversity is greatest at the interface with more "normal" forest associations.

JEFFREY PINE - HUCKLEBERRY OAK
PIJE-QUVA N = 15

EXTENT: Illinois Valley and Galice, some Chetco and Applegate Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	3137	1152	1560-5740
Aspect (deg)	170	74	78-268
Slope (%)	35	18	7-70
Soil Depth (in)	19	10	6-40
Total BA (ft^2)	106	98	20-320

GENERAL DESCRIPTION

Occurs on all slope and topographic positions, mostly on peridotite. There is almost no surface moss but 35% surface rock. Fire scars are common.

VEGETATION: (See page 272 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Jeffrey pine (PIJE)	19	93	Climax, good growth
incense-cedar (CADE3)	4	47	Seral to coclimax on wet sites
sugar pine (PILA)	7	20	Seral, on best ultrabasic sites
Douglas-fir (PSME)	4	53	Seral
Tree Understory			
Jeffrey pine (PIJE)	7	87	Survival and growth are fair
incense-cedar (CADE3)	10	73	Tolerance and growth are fair
Douglas-fir (PSME)	3	73	Tolerance to mineral imbalance is poor
California laurel (UMCA)	9	47	Wet sites, perched water table
huckleberry oak (QUVA)	15	73	Looks like QUCH
Shrub, Herb & Grass			
pinemat manzanita (ARNE)	23	27	Indicates shallow soils, good cover for cut banks and fill slopes
whiteleaf manzanita (ARVI)	14	53	Indicates disturbed, hot dry sites
all grasses	42	100	Food for ungulates, winter range

DISCUSSION: Shallow, clayey soils with high levels of magnesium and toxic heavy metals characterize the ultrabasic syndrome. The parent rock dominates the vegetation's expression. Tree production is low, and

although there is a choice of species for regeneration, it will be difficult. Port-Orford-cedar (Chamaecyparis lawsoniana) is not appropriate for this Association. Western serviceberry, California coffeeberry (Rhamnus californica), red fescue (Festuca rubra), and Sandberg's bluegrass (Poa sandbergii) provide forage. Southerly aspects may provide winter range. All sites provide structural diversity for birds.

JEFFREY PINE/DWARF CEANOTHUS
PIJE/CEPU N = 7

EXTENT: Common westside Illinois Valley and southern Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	1993	1169	1180-3860
Aspect (deg)	234	74	173-352
Slope (%)	16	15	2-45
Soil Depth (in)	12	6	6-24
Total BA (ft^2)	42	42	5-120

GENERAL DESCRIPTION

Occurs on all slope positions. Ultrabasic and breccia. Averages 69% surface rock cover with clayey soils. There is little evidence of past fire. Could be sensitive species present.

VEGETATION: (See page 272 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Jeffrey pine (PIJE)	12	100	Climax dominant, poor growth
incense-cedar (CADE3)	5	14	Coclimax, poor growth
Tree Understory			
Jeffrey pine (PIJE)	3	100	
incense-cedar (CADE3)	3	43	
Shrub, Herb & Grass			
hoaryleaf manzanita (ARVI)	15	100	Greater than 50 years old with fire scars
dwarf ceanothus (CEPU)	17	100	Good ground cover, deep rooted
all grasses	58	100	Forage, but not much carrying capacity

DISCUSSION: On the extreme sites some timber could be produced over a long rotation. On the average PIJE/CEPU sites, grazing is more appropriate than timber production. High water tables and clayey soils are common. The potential for soil compaction is high if stock is turned on when soil moisture is high. It may be possible to increase forage amounts by seeding with red fescue or Sandberg's bluegrass. This Association may have some of the serpentine sensitive species such as those listed on pages 8 and 9 of the Siskiyou sensitive plant guide (Siskiyou National Forest 1980). This Association lacks quality vertical structure for birds but may have some small mammals.

JEFFREY PINE/Grass
PIJE/Grass N = 6

EXTENT: Rain shadow area of Coast Range on ultrabasic rock. Illinios Valley and Galice Districts.

ENVIRONMENT:	AVG	SD	RANGE	GENERAL DESCRIPTION
Elevation (ft)	2180	669	1640-3200	Occurs on all topographic and slope positions.
Aspect (deg)	213	71	80-352	Little surface rock (20%) for peridotite
Slope (%)	28	14	13-45	
Soil Depth (in)	20	11	10-37	
Total BA (ft^2)	80	58	20-160	

VEGETATION: (See page 272 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Jeffrey pine (PIJE)	23	100	Climax dominant
incense-cedar (CADE3)	4	33	Seral to coclimax
Tree Understory			
Jeffrey pine (PIJE)	3	100	
incense-cedar (CADE3)	6	33	
Shrub, Herb & Grass			
all herbs	7	100	
all grasses	48	100	

DISCUSSION: Tree productivity in this Association is the lowest of the Jeffrey Pine Series. Forage production is fair and potential for enhancement is low. The south aspects are winter range, but forage and browse are poor quality. Structural diversity is fair for non-game animals. There is a high probability that sensitive plants occur within this Association.

JEFFREY PINE/IDAHO FESCUE
PIJE/FEID N = 2

EXTENT: Eastern Siskiyous, high elevation, very localized. Mostly Applegate District.

ENVIRONMENT:	AVG	SD	RANGE
Elevation (ft)	6395	134	6300-6490
Aspect (deg)	190	10	180-200
Slope (%)	37	16	25-48
Soil Depth (in)	11	1	10-12
Total BA (ft^2)	23	25	5-40

GENERAL DESCRIPTION

Occurs on ridgetops that are flat to convex with about 5% bare ground. There is no moss or rock cover on the serpentine derived soil.

VEGETATION: (See page 272 for complete table)

	AVG % COVER	% CONS	REMARKS
Tree Overstory			
Jeffrey pine (PIJE)	5	100	Climax dominant
Tree Understory			
white fir (ABCO)	1	50	Invading and may coexist with PIJE
Jeffrey pine (PIJE)	2	100	
Shrub, Herb & Grass			
oceanspray (HODI)	20	50	Common indicator of shallow soils
yarrow (ACMI)	12	100	Seral, indicator of disturbance
Idaho fescue (FEID)	66	100	Climax bunch grass, decreaser

DISCUSSION: This association could be lumped with the PIJE/Grass Association because it is not extensive. It is distinct and is described here because maintaining it as a productive meadow may require control of tree regeneration and maintenance of the bunchgrass. The sites will not produce significant amounts of timber. They were seriously overgrazed in the early part of this century and are continuing to slowly recover.

TABLE 15: CONSTANCY TABLE FOR JEFFREY PINE ASSOCIATIONS

	PIJE-PIMO		PIJE/QUVA		PIJE/CEPU		PIJE/Grass		PIJE/FEID	
Number of Samples	9		15		7		6		2	
	Cons[1/] (%)	Mean[2/] (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)	Cons (%)	Mean (%)
ENVIRONMENT:										
ELEV	100	4276	100	3137	100	1993	100	2180	100	6395
ASPECT	100	81	100	170	100	235	100	213	100	190
SLOPE	100	27	100	35	100	16	100	28	100	37
TODPTH	100	21	100	19	100	12	100	20	100	11
TOTBA	100	92	100	106	100	42	100	80	100	23
TREE OVERSTORY:										
PIMO	67	4								
PILA	11	5	20	7						
PIAT			13	5						
PSME	44	3	53	4	14	1	17	1		
CADE3	78	5	47	4	14	5	33	4		
PIJE	89	19	93	19	100	12	100	23	100	5
TOTALO	100	26	100	24	100	13	100	24	100	5
TREE UNDERSTORY:										
PIBR	11	1								
PIMO	100	9								
PIAT	11	7	7	8						
CHLA	22	3	7	3						
QUVA	78	23	73	15						
PSME	89	6	73	3						
ARME			7	1						
PILA			13	7						
UMCA	22	18	47	9	14	3				
CADE3	89	6	73	10	43	3	33	6		

TABLE 15 (Cont): CONSTANCY TABLE FOR JEFFREY PINE ASSOCIATIONS

	PIJE-PIMO		PIJE/QUVA		PIJE/CEPU		PIJE/Grass		PIJE/FEID	
Number of Samples	9		15		7		6		2	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
TREE UNDERSTORY (Cont):										
PIJE	100	17	87	7	100	3	100	3	100	2
ABCO	33	2							50	1
QUGA			7	1	14	1				
QUCH			13	6			17	3		
QUKE			13	4			33	1		
PREM									50	1
TOTALU	100	60	100	34	100	5	100	6	100	3
SHRUBS:										
ROGY	11	1								
VAPA	33	3								
JUCO4	11	20	7	5						
BEPU	56	2	13	2						
RHOC			7	20						
CEMO			20	1						
WHMO			20	1						
BEPI			7	1						
ARNE	78	17	27	23	14	3				
GABU	78	5	53	10	14	7				
ARVI	11	2	53	14	100	15	83	17		
CEPU	67	5	60	4	100	17	50	3		
RHCA	11	5	13	3	43	3	33	1		
ARPA	22	3	13	3			17	1		
AMPA	78	3	53	2	29	4			50	1

TABLE 15 (Cont): CONSTANCY TABLE FOR JEFFREY PINE ASSOCIATIONS

	PIJE-PIMO		PIJE/QUVA		PIJE/CEPU		PIJE/Grass		PIJE/FEID	
Number of Samples	9		15		7		6		2	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
SHRUBS (Cont):										
CECU			27	4	14	1	33	14		
HODI			13	3					50	20
CHNA									50	50
TOTALS	100	29	100	27	100	35	100	21	100	37
HERBS:										
ARLA	11	1								
GOOB	11	1								
PHCO3	11	1								
CASC2	11	3								
LIWA	22	1								
CAPU	33	1	7	1						
TRLA2	33	1	7	1						
TRRI	33	2	13	1						
COPO	33	1	20	1						
XETE	56	12	33	4						
IRCH	78	1	27	1						
ERHE2			7	1						
POMU			7	1						
PYDE			7	1						
SICA2			7	3						
SMST			13	1						
POCA8			13	2						
SELI			20	1						
AROR			27	1						
ERAL			20	2	14	T				

TABLE 15 (Cont): CONSTANCY TABLE FOR JEFFREY PINE ASSOCIATIONS

	PIJE-PIMO		PIJE/QUVA		PIJE/CEPU		PIJE/Grass		PIJE/FEID	
Number of Samples	9		15		7		6		2	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HERBS (Cont):										
SESP			13	1	29	2				
LOMAT	11	1	33	1	14	2				
ASDE	33	1	60	2	29	3	50	1		
GAAM	22	1	40	1	14	10	17	1		
ALLIU	11	1	60	1			33	1		
MAMA	33	1	33	1			17	1		
PHHEP	11	1	13	1			17	1		
BADE	22	1	7	1			17	1		
CAAP2	44	3	40	4			17	1	100	2
ERLA	33	2	27	1			17	1	100	5
ERIOG	11	2	27	2			33	1	50	1
LULA	11	3	7	1					100	3
MOOD	11	3	7	1					50	1
CRPL	11	1	13	1					50	3
EPMI	11	1	47	1	14	T			50	1
ACMI	22	1	40	2	14	5	50	1	100	12
CATO			20	2	14	T	17	1		
COGR			27	1	14	1	17	1		
HOSE			13	8	71	11	33	1		
RAOC			40	2	14	1	17	1		
BRODI			13	1			17	1		
COPA			13	1			33	1		
HIAL							17	1		
ERUM			7	1					100	5
CHDO									100	2

TABLE 15 (Cont): CONSTANCY TABLE FOR JEFFREY PINE ASSOCIATIONS

	PIJE-PIMO		PIJE/QUVA		PIJE/CEPU		PIJE/Grass		PIJE/FEID	
Number of Samples	9		15		7		6		2	
	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean	Cons	Mean
HEBRS (Cont):										
ANMA									100	1
CORA2									100	1
ARCO									50	1
LULE									50	1
VIAM									50	1
TOTALH	100	17	100	16	100	13	100	7	100	39
GRASSES:										
FESTU		7	T							
FESU		7	80							
CAREX	44	3	20	2	43	2				
POSA3	11	1	40	37	14	50	50	37		
FERU	11	50	40	28			50	36		
POA	44	2	7	30			17	30		
FEID	11	3							100	66
DACA			13	36	43	4	17	30		
SIHY			7	1	14	3			100	1
BROMU			7	1			17	1		
BRCA					14	20	17	1		
STLE2					71	51	17	1		
ELGL							17	1		
MESU							17	3		
TOTALG	100	8	100	42	100	58	100	48	100	67

1/ Constancy - percentage of samples (plots) in the association which contained the species (or variable).
2/ Mean - average of the cover observations for each species, computed using only the samples in which they occur. A mean of 'T' indicates that the value is less than 1 percent.

THE LODGEPOLE PINE SERIES

There are a few, small, isolated sites that can support lodgepole pine (Pinus contorta) for over several hundred years. These sites are scattered from Powers to Ashland at higher elevations. Although the lodgepole pine is succeeding itself, the regeneration is related to temporal episodes. On the Powers site, for example, fire is frequent enough to eliminate western hemlock (Tsuga heterophylla) competition and stimulate lodgepole regeneration. At Tamarack Meadows on the Applegate District, several consecutive years of drought have dried the site enough for Shasta red fir (Abies magnifica shastensis) to invade. In both cases the regeneration is related to specific episodes of disturbance. These episodes of fire or drought sustain lodgepole on sites that will, over the millennia, resemble the surrounding vegetation.

Spatially, the lodgepole sites are potentially different. They occur at local topographic and/or edaphic extremes. That is, each of these sites has either shallow soil or standing water much of the growing season.

These sites provide valuable diversity and could be managed to maintain their composition and structure. For maintenance, some sites may need treatment while others will not. For Districts managing these sites, they can be classed on a functional or environmental basis so that each occurrence will not require a separate management plan.

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GLOSSARY

ASSOCIATION	A kind of plant community with a definite species composition and structure, and relatively uniform environment.
CLIMAX	The end point of one or more successional stages charcterized by stable species composition and structure.
CONSTANCY	The percent occurrence of a species within an association.
MEAN	(Or average) The sum of a group of measurements for a variable, divided by the number of occurrences.
META...	Prefix indicating that the material has undergone metamorphosis through high pressure and temperature; as in metavolcanics and metasediments.
OVERSTORY	The portion of trees that form the uppermost canopy layer in a forest, i.e., dominants ad codominants.
SERAL	A stage of succession characterized by change in plant composition and structure.
SERIES	A collection of plant associations with the same climax dominant(s). For example the Douglas-fir Series would include all associations in which Douglas-fir is the climax dominant.
SUCCESSION	The process which occurs through time on a site; the changes are in vegetation composition and structure. Classical succession is that which occurs on bare rock and the evolution of that site to climax.
TOTALG	The total vertical cover in percent of all grass and grass-like species.
TOTALH	The total vertical cover in percent of all herbaceous species.
TOTALO	The total vertical cover in percent of all overstory tree species.
TOTALS	The total vertical cover in percent of all shrub species.
TOTALU	The total vertical cover in percent of all understory tree species. The value may exceed 100 percent in multilayered conditions.
ULTRABASIC	Geologic parent rock, usually serpentine or peridotite (sometimes gabbro), with a high content of Mg, Cr, and Ni; and low in Ca (very unfertile); pH is high.
UNDERSTORY	The portion of the trees in a forest stand that occurs below the overstory layer; it is usually of a younger age class.

APPENDIX A: Successional Status of Species by Association.

	SPECIES CODE																
ASSOCIATION	ABCO	ABMAS	CADE3	CHLA	LIDE3	PIBR	PICO	PIJE	PILA	PIMO	PIPO	PSME	SESE2	TABR	THPL	TSHE	TSME
TSME/POPU		S															C
ABMAS/Sheep		C								S							
ABMAS/POPU	S	C								S							M
ABMAS-QUSA	M	C	M						S	S		S					M
ABMAS/SYMO	M	C	M							S		S					M
PIMO/XETE	M	S								C							M
ABCO-ABMAS/RIBES	C	O	S									S					M
ABCO-ABMAS/ROGY	C	O		S								S					M
ABCO-ABMAS/SYMO	C	O	S	M						S		S					M
ABCO-QUSA/CHUM	C	M	M			M			S	S		S					
ABCO-QUSA/BENE-PAMY	C	M	M	M					S			S		M			
ABCO-QUSA/BENE	C	S	M		S				S			S					
ABCO-QUSA-CACH	C	M	M	M	S				S		S	S		M			
ABCO-CHNO	C	M	S			M											M
ABCO-PIBR/VAME	C	S	M	S		M			S	S	S	S		M			M
ABCO-PIBR/GAOV	C	S		S	S	M			S			S		M			M
ABCO-PIBR/CHUM	C	S	M			O			S	S	S	S		M			
ABCO-LIDE3	C		S	M	O				S		S	S		M			
ABCO-TABR	C	M	S	S	S	M			S		S	S		M			
ABCO-CHLA	C	S	S	O	S					S		S		M			
ABCO-PSME	C	S	S		M				S		S	S		M			
ABCO-BENE	C	S	S		M				S		S	S		M			
ABCO-ACGL	C	S	S						S		S	S		M			
ABCO/Herb	C	S	S	S					S		S	S					
ABCO-CHLA/Depaup.	C		M	O		M			S	S	S	S					
ABCO-PSME/BENE	C	S	S	S					S	S	S	S		M			
ABCO-PSME/Depaup.	C	S	S		S				S		S	S		M			
ABCO-PSME/HODI	C	S	M					S	S		S	S		M			
ABCO-PIPO	C	S	M						S		S	S					
ABCO/SYMO	C	S	M		S			S	S	S	S	S					S
TSHE-ABCO	O		S		S				S			S		M		C	
TSHE-THPL				S	M							S			O	C	

C = CLIMAX DOMINANT
O = COCLIMAX (CAN HAVE EQUAL STATUS WITH CLIMAX DOMINANT)
M = MINOR CLIMAX (USUALLY SUBORDINATE TO CLIMAX DOMINANT)
S = SERAL (TRANSITORY WILL BE REPLACED BY CLIMAX SPECIES)

ASSOCIATION	ABCO	ABMAS	CADE3	CHLA	LIDE3	PIBR	PICO	PIJE	PILA	PIMO	PIPO	PSME	SESE2	TABR	THPL	TSHE	TSME
								SPECIES CODE									
TSHE-THPL/High	M											S			O	C	
TSHE-QUSA				M					S			S				C	
TSHE-CHLA				O	M					S		S		M		C	
TSHE/GASH				M					S			S				C	
TSHE/RHMA				M	M							S				C	
TSHE-UMCA	M			M	M							S				C	
LIDE3-TSHE				M	C				S			S				O	
CHLA/BENE/ACTR	M			C								S		M			
CHLA/GASH	M			C	M	M			S			S		M			
CHLA/BENE/LIBOL	M			C	O			S	S			S		M			
CHLA/QUVA	M			C		M			S	S		S		M			
CHLA/GABU				O	M			O		S		S					
CHLA-ACMA			M	C								S		M			
LIDE3-SESE2					C							S	O			O	
LIDE3/VAOV2-GASH					C				S			S					
LIDE3/VAOV2	M				C				S			S					
LIDE3-UMCA					C							S		M			
LIDE3/RHMA					C							S					
LIDE3/RHMA-VAOV2					C				S			S		M			
LIDE3/RHMA-GASH					C				S	S		S		M			
LIDE3/GASH					C				S			S					
LIDE3-CHLA				M	C				S		S	S		M			
LIDE3/RHCA			M	M	C		S	M	S	M	S	S					
LIDE3/GASH-RHMA	M			M	C				S		S	S		M			
LIDE3/GASH-BENE			M	S	C				S		S	S		M			
LIDE3-ACCI	M		M	M	C				S		S	S		M			
LIDE3-ABCO-ACCI	M		S		C				S		S	S		M			
LIDE3-ABCO	O		S	S	C				S			S					
LIDE3/BENE			S	M	C				S	S	S	S		M			
LIDE3/BENE-RHDI			M		C				S		S	S					
LIDE3-QUCH	M		M		C				S		S	S		M			
LIDE3-QUCH/BENE			M		C				S			S		M			
LIDE3/RHDI-LOHI			M	S	C		S				S	S					
PSME-ABCO-PIJE	O		S					M	S	S		C					
PSME-ABCO	M		S						S	S	S	C					
PSME-ABCO-PIPO	M			S	M				M		S	C		M			
PSME-ABCO/HODI	M		S						S	S	S	C					
PSME-ABCO/BENE	M		S		M				S		S	C		M			
PSME/RHMA			S	S	M				S		S	C		M			
PSME-LIDE3/GASH	M	S	S		M				M		S	C		M		M	

SPECIES CODE

ASSOCIATION	ABCO	ABMAS	CADE3	CHLA	LIDE3	PIBR	PICO	PIJE	PILA	PIMO	PIPO	PSME	SESE2	TABR	THPL	TSHE	TSME
PSME-LIDE3-PILA					M				S		S	C		M			
PSME-LIDE3/RHDI	M		S		M				S	S	S	C		M			
PSME-LIDE3	M				M				S		S	C					
PSME-LIDE3-QUCH			S		M				S		S	C					
PSME-QUSA	M		S	S	M			S	S		S	C		M			
PSME/BERE				S					S			C					
PSME/BENE	M		S						S		S	C		M			
PSME/RHDI-BEPI			S						S		S	C					
PSME/RHDI			S						S		S	C					
PSME-PIPO	M		S						S		O	C					
PSME/Depaup.			S						S		S	C					
PSME/PIJE	M		O					O	S		S	C					
PIPO-PSME		S	M		M		S		S	S		O					
PICO		S	S				C			S							S
PIJE-PIMO	M		O	M		S		C	S	O		S					
PIJE-QUVA			O	S				C	S			S					
PIJE/CEPU			O					C				S					
PIJE/GRASS			O					C				S					
PIJE/FEID	M							C									

Appendix B. Species List by Scientific Name.

Scientific name	Common name	CODE
Abies concolor	white fir	ABCO
Abies grandis	grand fir	ABGR
Abies lasiocarpa	subalpine fir	ABLA
Abies magnifica shastensis	Shasta red fir	ABMAS
Acer circinatum	vine maple	ACCI
Acer glabrum	Rocky Mountain maple	ACGL
Acer macrophyllum	bigleaf maple	ACMA
Achillea millefolium	common yarrow	ACMI
Achlys triphylla	vanillaleaf	ACTR
Aconitum columbianum	Columbian monkshood	ACCO
Actaea rubra	baneberry	ACRU
Adenocaulon bicolor	trail-plant	ADBI
Adiantum pedatum	western maidenhair-fern	ADPE
Agastache urticifolia	nettle-leaf giant-hyssop	AGUR
Agoseris grandiflora	large-flowered agoseris	AGGR
Agrostis	bentgrass	AGROS
Agrostis alba	pale bentgrass	AGAL
Agrostis hallii	Hall's bentgrass	AGHA
Allium	wild onion	ALLIU
Allium falcifolium	sickle-leaved onion	ALFA
Allium siskiyouense	Siskiyou onion	ALSI3
Allium tolmiei	Tolmie's onion	ALTO
Allotropa virgata	candystick	ALVI
Alnus rubra	red alder	ALRU
Alnus sinuata	sitka alder	ALSI
Amelanchier alnifolia	western serviceberry	AMAL
Anaphalis	pearly-everlasting	ANAPH
Anaphalis margaritacea	common pearly-everlasting	ANMA
Anemone deltoidea	threeleaf anemone	ANDE
Anemone drummondii	Drummond's anemone	ANDR
Anemone lyallii	Lyall's anemone	ANLY2
Angelica arguta	sharptooth angelica	ANAR2
Antennaria neglecta	field everlasting	ANNE2
Antennaria suffretescens	shrubby everlasting	ANSU
Apocynum androsaemifolium	spreading dogbane	APAN
Aquilegia formosa	red columbine	AQFO
Arabidopsis thaliana	Thale cress	ARTH
Arabis	rockcress	ARABI
Arabis aculeolata	wall rockcress	ARAC
Arabis glabra	towermustard	ARGL
Arabis hirsuta	hairy rockcress	ARHI
Arabis holboellii	Holboell's sandwort	ARHO
Arabis oregana	Oregon rockcress	AROR
Arabis platysperma	flatseed rockcress	ARPL
Arabis platysperma howellii	Howell's rockcress	ARPLH
Arabis puberula	hoary rockcress	ARPU
Aralia	wild sarsaparilla	ARALI
Arbutus menziesii	Pacific madrone	ARME
Arctostaphylos cinera	gray manzanita	ARCI

Appendix B. Species List by Scientific Name.

Scientific name	Common name	CODE
Arctostaphylos columbiana	hairy manzanita	ARCO3
Arctostaphylos nevadensis	pinemat manzanita	ARNE
Arctostaphylos patula	greenleaf manzanita	ARPA
Arctostaphylos viscida	whiteleaf manzanita	ARVI
Arenaria	sandwort	ARENA
Arenaria macrophylla	bigleaf sandwort	ARMA3
Arenaria nuttallii	Nuttall's sandwort	ARNU
Arnica	arnica	ARNIC
Arnica cordifolia	heart-leafed arnica	ARCO
Arnica discoidea	rayless arnica	ARDI
Arnica latifolia	broad-leafed arnica	ARLA
Arnica parryi	nodding arnica	ARPA3
Arrhenatherum elatus	tall oatgrass	AREL
Artemisia ludoviciana	western mugwort	ARLU
Artemisia tridentata	big sagebrush	ARTR
Aruncus sylvester	Sylvan goatsbeard	ARSY
Asarum caudatum	wild ginger	ASCA3
Asarum hartwegii	marbled wild ginger	ASHA
Aspidotis densa	cliff-brake	ASDE
Aster brickellioides	aster	ASBR
Aster brickellioides glabratus	aster	ASBRG
Aster conspicuus	showy aster	ASCO
Astragalus	locoweed	ASTRA
Astragalus whitneyi	balloon milk-vetch	ASWH
Athyrium filix-femina	lady-fern	ATFI
Baeria minor	small goldfields	BAMI
Balsamorhiza	balsamroot	BALSA
Balsamorhiza deltoidea	deltoid balsamroot	BADE
Bensoniella oregana	Oregon bensonia	BEOR
Berberis aquifolium	tall Oregongrape	BEAQ
Berberis nervosa	dwarf Oregongrape	BENE
Berberis piperiana	Piper's Oregongrape	BEPI
Berberis pumila	pygmy hollygrape	BEPU
Berberis repens	creeping Oregongrape	BERE
Blechnum spicant	deer-fern	BLSP
Blepharipappus scaber	blepharipappus	BLSC
Boschniakia strobilacea	ground-cone	BOST2
Boykina elata	slender boykinia	BOEL
Boykinia major	mountain boykinia	BOMA
Brodiaea	brodiaea	BRODI
Brodiaea congesta	Columbia brodiaea	BRCO3
Brodiaea elegans	elegant brodiaea	BREL
Brodiaea hendersonii	Henderson's brodiaea	BRHE
Brodiaea ida-maia	fire-cracker brodiaea	BRID
Bromus	brome	BROMU
Bromus carinatus	California brome	BRCA
Bromus pacificus	Pacific brome	BRPA
Bromus suksdorfii	Suksdorf's brome	BRSU
Bromus tectorum	cheatgrass brome	BRTE

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Scientific name	Common name	CODE
Bromus vulgaris	Columbia brome	BRVU
Calocedrus decurrens	incense-cedar	CADE3
Calochortus tolmiei	Tolmie's cats-ear	CATO
Caltha biflora biflora	white marshmarigold	CABIB
Calypso bulbosa	fairy-slipper	CABU2
Camagrostis koelerioides	fire reedgrass	CAKO
Camassia	camas	CAMAS
Camassia quamash	common camas	CAQU
Campanula prenanthoides	California harebell	CAPR3
Campanula scouleri	Scouler's harebell	CASC2
Cardamine pulcherrima	slender toothwort	CAPU
Cardamine pulcherrima pulcherrima	slender toothwort	CAPUP
Cardamine pulcherrima tenella	slender toothwort	CAPUT
Carex	sedge	CAREX
Carex concinnoides	northwestern sedge	CACO
Carex feta	greensheathed sedge	CAFE2
Carex halliana	Hall's sedge	CAHA2
Carex hoodii	Hood's sedge	CAHO
Carex jonesii	Jones' sedge	CAJO
Carex limosa	mud sedge	CALI
Carex pensylvanica	long stolon sedge	CAPE5
Castanopsis chrysophylla	golden chinquapin	CACH
Castilleja	paintbrush	CASTI
Castilleja applegatei	Applegate's paintbrush	CAAP2
Castilleja applegatei applegatei	Applegate's paintbrush	CAAPA
Ceanothus cuneatus	wedgeleaf ceanothus	CECU
Ceanothus integerrimus	deerbrush ceanothus	CEIN
Ceanothus prostratus	squawcarpet ceanothus	CEPR
Ceanothus pumilus	dwarf ceanothus	CEPU
Ceanothus sanguineus	redstem ceanothus	CESA
Ceanothus thyrsiflorus	blue blossom ceanothus	CETH
Ceanothus velutinus	snowbrush ceanothus	CEVE
Cerastium arvense	field chickweed	CEAR
Cercocarpus ledifolius	curl-leaf mountain-mahogany	CELE
Cercocarpus montanus	birch-leaf mountain-mahogany	CEMO
Chaenactis douglasii	hoary falseyarrow	CHDO
Chamaecyparis lawsoniana	Port-Orford-cedar	CHLA
Chamaecyparis nootkatensis	Alaska-cedar	CHNO
Chimaphila menziesii	little prince's-pine	CHME
Chimaphila umbellata	western prince's-pine	CHUM
Chrysothamnus nauseosus	tall gray rabbitbrush	CHNA
Circaea alpina	alpine enchanter's nightshade	CIAL
Clarkia gracilis	slender godetia	CLGR
Clarkia purpurea	purple godetia	CLPU2
Clarkia rhomboidea	rhombic-petaled clarkia	CLRH
Clintonia uniflora	Queen's cup	CLUN
Collinsia grandiflora	large-flowered blue-eyed Mary	COGR
Collinsia parviflora	small-flowered blue-eyed Mary	COPA
Collinsia rattanii	Rattan blue-eyed Mary	CORA2

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Scientific name	Common name	CODE
Collomia heterophylla	varied-leaf collomia	COHE
Convolvulus polymorphus	variable morning-glory	COPO
Convolvulus subacaulis	stemless morning glory	COSU
Coptis laciniata	cutleaf goldthread	COLA
Corallorhiza	coral-root	CORAL
Corallorhiza maculata	spotted coral-root	COMA3
Corallorhiza mertensiana	western coral-root	COME
Corallorhiza striata	striped coral-root	COST2
Cornus nuttallii	Pacific dogwood	CONU
Cornus stolonifera	red-osier dogwood	COST
Corylus cornuta californica	California hazel	COCOC
Crepis acuminata	long-leaved hawksbeard	CRAC
Crepis pleurocarpa	naked-stemmed hawksbeard	CRPL
Cryptantha simulans	pine woods cryptantha	CRSI
Cryptogramma crispa	parsley-fern	CRCR
Cynoglossum grande	Pacific hound's-tongue	CYGR
Cynoglossum occidentale	western hound's-tongue	CYOC
Cynosorus echinatus	hedgehog dogtail	CYEC
Danthonia californica	california oatgrass	DACA
Delphinium	larkspur	DELPH
Deschampsia caespitosa	tufted hairgrass	DECA
Deschampsia danthonioides	annual hairgrass	DEDA
Descurainia pinnata	western tansymustard	DEPI
Dicentra formosa	Pacific bleedingheart	DIFO
Dicentra formosa oregona	Oregon bleedingheartt	DIFOO
Disporum hookerii oreganum	Oregon fairy-bell	DIHOO
Disporum smithii	Smith fairy-bell	DISM
Dodecatheon hendersonii	Henderson's shooting star	DOHE
Dryopteris austriaca	mountain woodfern	DRAU2
Eburophyton austinae	phantom-orchid	EBAU
Elymus	wildrye	ELYMU
Elymus glaucus	blue wildrye	ELGL
Epilobium	willow-herb	EPILO
Epilobium angustifolium	fireweed	EPAN
Epilobium minutum	samll-flowered willow-herb	EPMI
Epilobium paniculatum	autumn willow-herb	EPPA
Epilobium rigidum	rigid willow-herb	EPRI
Equisetum arvense	common horsetail	EQAR
Erigeron	fleabane (or daisy)	ERIGE
Erigeron aliceae	Alice fleabane	ERAL
Erigeron linearis	line-leaf fleabane	ERLI
Erigonum pyrolifolium coryphaeum	alpine buckwheat	ERPYC
Eriogonum	buckwheat	ERIOG
Eriogonum elatum	tall buckwheat	EREL2
Eriogonum nudum	barestem buckwheat	ERNU
Eriogonum umbellatum	sulphur buckwheat	ERUM
Eriogonum umbellatum polyanthum	sulphur buckwheat	ERUMP
Eriogonum umbellatum stellatum	sulphur buckwheat	ERUMS
Eriogonum vimineum	broom buckwheat	ERVI

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Scientific name	Common name	CODE
Eriophyllum lanatum	woolly sunflower	ERLA
Erysimum asperum	rough wallflower	ERAS
Erythronium grandiflorum	pale fawn-lily	ERGR
Erythronium grandiflorum grandiflorum	yellow fawn-lily	ERGRG
Erythronium hendersonii	Henderson's fawn-lily	ERHE2
Erythronium howellii	Howell's fawn-lily	ERHO2
Festuca	fescue	FESTU
Festuca californica	Californic fescue	FECA
Festuca idahoensis	Idaho fescue	FEID
Festuca occidentalis	western fescue	FEOC
Festuca ovina	sheep fescue	FEOV
Festuca pratensis	meadow fescue	FEPR
Festuca rubra	red fescue	FERU
Festuca subulata	bearded fescue	FESU
Festuca subuliflora	crinkleawn fescue	FESU2
Foeniculum vulgare	sweet fennel	FOVU
Fragaria	strawberry	FRAGA
Fragaria vesca bracteata	woods strawberry	FRVEB
Frasera albicaulis nitida	shiny frasera	FRALN
Frasera speciosa	giant frasera	FRSP
Fraxinus latifolia	Oregon ash	FRLA2
Fritillaria atropurpurea	checker lily	FRAT
Fritillaria lanceolata	checker lily	FRLA
Fritillaria pudica	yellow bell	FRPU
Galium ambiguum	obscure bedstraw	GAAM
Galium aparine	cleavers bedstraw	GAAP
Galium bifolium	thinleaf bedstraw	GABI
Galium bolanderi	Bolander's bedstraw	GABO
Galium oreganum	Oregon bedstraw	GAOR
Galium trifidum	small bedstraw	GATR
Garrya buxifolia	box-leaved silktassel	GABU
Garrya fremontii	Fremont silktassel	GAFR
Gastridium ventricosum	nitgrass asera	GAVE2
Gaultheria ovatifolia	slender salal	GAOV
Gaultheria shallon	salal	GASH
Gentiana	gentian	GENTI
Gentiana simplex	one-flowered gentian	GESI
Geranium	crane's-bill	GERAN
Geum macrophyllum	Oregon avens	GEMA
Gilia aggregata	scarlet gilia	GIAG
Gilia capitata	bluefield gilia	GICA
Goodyeara oblongifolia	western rattlesnake-plantain	GOOB
Habenaria dilatata	white bog-orchid	HADI2
Habenaria elegans	elegant bog-orchid	HAEL
Habenaria unalascensis	Alaska bog-orchid	HAUN
Hackelia deflexa	nodding stickseed	HADE
Haplopappus	happlopappus	HAPLO2
Hemitomes congestum	gnome-plant	HECO
Heracleum lanatum	common cow-parsnip	HELA

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Scientific name	Common name	CODE
Heuchera micrantha	smallflower alumroot	HEMI
Heuchera micrantha micrantha	smallflower alumroot	HEMIM
Hieracium albiflorum	white-flowered hawkweed	HIAL
Hieracium greenei	Green's hawkweed	HIGR2
Hierochloe occidentalis	California sweetgrass	HIOC
Holodiscus discolor	creambush oceanspray	HODI
Horkelia sericata	silky horkelia	HOSE
Hydrophyllum	waterleaf	HYDRO
Hydrophyllum capitatum	ballhead waterleaf	HYCA
Hydrophyllum capitatum alpinum	alpine waterleaf	HYCAA
Hydrophyllum capitatum capitatum	dwarf waterleaf	HYCAC
Hydrophyllum fendleri albifrons	whiteleaf Fendler's waterleaf	HYFEA
Hydrophyllum occidentale	California waterleaf	HYOC
Hydrophyllum tenuipes	Pacific waterleaf	HYTE
Hypericum perforatum	common St John's-wort	HYPE
Hypopitys monotropas	pinesap	HYMO
Iris chrysophylla	slender-tubed iris	IRCH
Iris tenax	Oregon iris	IRTE
Iris tenax klamathensis	Klamath iris	IRTEK
Juncus parryi	Parry's rush	JUPA
Juniperus communis	common juniper	JUCO4
Kalmia	laurel	KALMI
Koelaria cristata	prairie junegrass	KOCR
Lathyrus	peavine	LATHY
Lathyrus polyphyllus	leafy peavine	LAPO
Lepidium latifolium	pepperwort	LELA
Leucothoe davisiae	Sierra laurel	LEDA
Lewisia leana	many-flowered lewisia	LELE
Ligusticum apiifolium	celery-leaved licorice-root	LIAP
Lilium	lily	LILIU
Lilium bolanderi	Bolander's lily	LIBO3
Lilium washingtonianum	Washington lily	LIWA
Linnaea borealis longiflora	western twinflower	LIBOL
Linum lewisii	western blue flax	LILE
Linum perenne lewisii	Lewis's flax	LIPEL
Listera	twayblade	LISTE
Listera caurina	western twayblade	LICA3
Listera cordata	heart-leaf twayblade	LICO3
Lithocarpus densiflorus	tanoak	LIDE3
Lithophragma parviflora	smallflower fringecup	LIPA
Lomatium	biscuit-root	LOMAT
Lomatium martindalei	Martindale's biscuit-root	LOMA2
Lomatium triternatum	nine-leaf biscuit- root	LOTR
Lomatium triternatum triternatum	nine-leaf biscuit-root	LOTRT
Lomatium utriculatum	common deervetchuit-root	LOUT
Lonicera	honeysuckle	LONIC
Lonicera ciliosa	orange honeysuckle	LOCI
Lonicera conjugialis	purple-flower honeysuckle	LOCO
Lonicera hispidula	hairy honeysuckle	LOHI

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Scientific name	Common name	CODE
Lotus	deervetch	LOTUS
Lotus crassifolius	big deervetch	LOCR
Lotus micranthus	small-flowered deervetch	LOMI
Lupinus	lupine	LUPIN
Lupinus albicaulis	sickle-keeled lupine	LUAL
Lupinus albifrons	white-leaved lupine	LUAL2
Lupinus bicolor	two-color lupine	LUBI
Lupinus leucophyllus	velvet lupine	LULE
Lupinus polyphyllus pallidipes	bigleaf lupine	LUPOP
Luzula parviflora	small flowered woodrush	LUPA
Madia elegans	showy tarweed	MAEL
Madia madioides	woodland tarweed	MAMA
Melica	oniongrass	MELIC
Melica aristata	bearded oniongrass	MEAR
Melica geyeri	Geyer's oniongrass	MEGE
Melica subulata	Alaska oniongrass	MESU
Melissa officinalis	bee balm	MEOF2
Menziesia ferruginea	rusty menziesia	MEFE
Mertensia bella	Oregon bluebells	MEBE
Mimulus	monkey-flower	MIMUL
Mimulus alsinoides	chickweed monkey-flower	MIAL
Mimulus guttatus	yellow monkey-flower	MIGU
Mitella	mitrewort	MITEL
Mitella trifida	three-tooth mitrewort	MITR2
Monardella odoratissima	mountain monardella	MOOD
Monotropa hypopithys	pinesap	MOHY
Monotropa uniflora	Indian-pipe	MOUN2
Montia	montia	MONTI
Montia dichotoma	dwarf montia	MODI
Montia parvifolia	littleleaf montia	MOPA
Montia perfoliata	miner's lettuce	MOPE
Montia perfoliata depressa	miner's lettuce	MOPED
Montia sibirica	Siberian montia	MOSI
Montia sibirica bulbifera	Siberian montia	MOSIB
Montia sibirica sibirica	Siberian montia	MOSIS
Montia spathulata	pale montia	MOSP
Nemophila heterophylla	varied-leaf nemophila	NEHE
Nemophila parviflora	small-flowered nemophila	NEPA
Nothochelone nemorosa	woodland beard-tongue	NONE
Oemelaria cerasiformis	Indian plum	OECE
Orobanche fasiculata	clustered broomrape	ORFA2
Orobanche uniflora	naked broomrape	ORUN
Orthocarpus cryptanthus	broad-scaled owl-clover	ORCR
Orthocarpus cuspidatus	broad-scaled owl-clover	ORCU
Orthocarpus hispidus	hairy owl-clover	ORHI
Orthocarpus imbricatus	mountain owl-clover	ORIM
Orthocarpus pusillus	dwarf owl-clover	ORPU
Osmorhiza chilensis	mountain sweet-root	OSCH
Osmorhiza occidentalis	western sweet-root	OSOC

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Scientific name	Common name	CODE
Osmorhiza purpurea	purple sweet-root	OSPU
Oxalis oregana	Oregon wood-sorrel	OXOR
Oxalis suksdorfii	western yellow wood-sorrel	OXSU
Oxalis trilliifolia	great wood-sorrel	OXTR
Pachistima myrsinites	Oregon boxwood	PAMY
Pedicularis howellii	Howell's pedicularis	PEHO
Pedicularis racemosa	leafy pedicularis	PERA
Penstemon	penstemon	PENST
Penstemon anguineus	tongue-leaved penstemon	PEAN
Penstemon azureus	azure penstemon	PEAZ
Penstemon deustus	hot-rock penstemon	PEDE
Penstemon lemmonii	Lemmon's penstemon	PELE2
Penstemon newberryi	newberry's penstemon	PENE
Penstemon parvulus	penstemon	PEPA3
Petasites frigidus	alpine coltsfoot	PEFR2
Phacelia corymbosa	phacelia	PHCO3
Phacelia hastata	whiteleaf phacelia	PHHA
Phacelia heterophylla	varileaf phacelia	PHHE
Phacelia heterophylla pseudohispida	varileaf phacelia	PHHEP
Phalaris	canarygrasscelia	PHALA
Philadelphus lewisii	Lewis mockorange	PHLE2
Phleum pratense	common timothy	PHPR
Phlox adsurgens	woodland phlox	PHAD
Phlox diffusa	spreading phlox	PHDI
Phlox speciosa	showy phlox	PHSP
Physocarpus capitatus	Pacific ninebark	PHCA3
Picea breweriana	Brewer spruce	PIBR
Pinus attenuata	knobcone pine	PIAT
Pinus contorta	lodgepole pine	PICO
Pinus jeffreyi	Jeffrey pine	PIJE
Pinus lambertiana	sugar pine	PILA
Pinus monticola	western white pine	PIMO
Pinus ponderosa	ponderosa pine	PIPO
Pityopus californica	pine-foot	PICA
Plagiobothrys nothofulvus	rusty popcorn-flower	PLNO
Poa	bluegrass	POA
Poa bulbosa	bulbous bluegrass	POBU
Poa leibergii	Leiberg's bluegrass	POLE2
Poa palustris	fowl bluegrass	POPA
Poa pratensis	Kentucky bluegrass	POPR
Poa sandbergii	Sandberg's bluegrass	POSA3
Poa scabrella	pine bluegrass	POSC
Polemonium carneum	great polemonium	POCA2
Polemonium pulcherrimum	skunkleaf polemonium	POPU
Polygala californica	California milkwort	POCA8
Polygonum	doorweed (or knotweed)	POLYG
Polygonum bistortoides	snakeweed	POBI
Polygonum cascadense	Cascadian knotweed	POCA5
Polygonum phytolaccaefolium	alpine knotweed	POPH

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Scientific name	Common name	CODE
Polygonum scandens	hedge cornbind	POSC2
Polypodium	polypody	POLYP
Polypodium hesperium	Columbia licorice-fern	POHE2
Polystichum	sword-fern	POLYS
Polystichum mohriodes	Shasta fern	POMO3
Polystichum munitum	sword-fern	POMU
Potenitilla glandulosa glandulosa	sticky cinquefoil	POGLG
Potentilla	cinquefoil	POTEN
Potentilla glandulosa	sticky cinquefoil	POGL
Potentilla glandulosa nevadensis	Nevada cinquefoil	POGLN
Potentilla gracilis	common cinquefoil	POGR
Potentilla quinquefolia	snow cinquefoil	POQU
Prunus emarginata	bitter cherry	PREM
Prunus virginiana	common chokecherry	PRVI
Pseudotsuga menziesii	Douglas-fir	PSME
Psoralea physodes	California-tea	PSPH
Pteridium aquilinum	braken	PTAQ
Pterospora andromedea	pinedrops	PTAN
Purshia tridentata	antelope bitterbrush	PUTR
Pyrola aphylla	leafless pyrola	PYAP
Pyrola assarifolia	alpine pyrola	PYAS
Pyrola assarifolia purpurea	liver-leaf pyrola	PYASP
Pyrola dentata	toothleaf pyrola	PYDE
Pyrola picta	white vein pyrola	PYPI
Pyrola secunda	one-sided pyrola	PYSE
Quercus chrysolepis	canyon live oak	QUCH
Quercus garryana	Oregon white oak	QUGA
Quercus kelloggii	California black oak	QUKE
Quercus sadleriana	Sadler oak	QUSA
Quercus vaccinifolia	huckleberry oak	QUVA
Ranunculus alismaefolius alismellus	dwarf plaintainleaf buttercup	RAALA
Ranunculus occidentalis	western buttercup	RACC
Ranunculus occidentalis occidentalis	western buttercup	RAOCO
Rhamnus californica	California coffeeberry	RHCA
Rhamnus purshiana	cascara	RHPU
Rhododendron macrophyllum	Pacific rhododendron	RHMA
Rhododendron occidentale	western azalea	RHOC
Rhus diversiloba	poison oak	RHDI
Ribes	gooseberry (or currant)	RIBES
Ribes binominatum	Siskiyou gooseberry	RIBI
Ribes cereum	wax currant	RICE
Ribes cruentum	shinyleaf gooseberry	RICR
Ribes lacustre	prickly currant	RILA
Ribes lobbii	Lobb's gooseberry	RILO
Ribes marshallii	Applegate gooseberry	RIMA
Ribes sanguineum	red-flowering currnat	RISA
Ribes velutinum	desert gooseberry	RIVE
Ribes viscosissimum	sticky currant	RIVI
Rosa	rose	ROSA

Appendix B. Species List by Scientific Name.

Scientific name	Common name	CODE
Rosa gymnocarpa	baldhip rose	ROGY
Rubus	blackberry (or bramble)	RUBUS
Rubus lasiococcus	dwarf blackberry	RULA
Rubus leucodermis	blackcap	RULE
Rubus nivalis	snow bramble	RUNI
Rubus parviflorus	thimbleberry	RUPA
Rubus spectabilis	salmonberry	RUSP
Rubus ursinus	trailing blackberry	RUUR
Rumex occidentalis	western dock	RUOC2
Salicaceae	willow	SALIX
Sambucus	elderberry	SAMBU
Sambucus arborescens	red elderberry	SAAR5
Sambucus cerulea	blue elderberry	SACE
Sambucus racemosa	red elderberry	SARA
Sambucus racemosa arborescens	red elderberry	SARAA
Sarcodes sanguinea	snow plant	SASA2
Satureja douglasii	yerba buena	SADO
Saxifraga	saxifrage	SAXIF
Saxifraga mertensiana	wood saxifrage	SAME3
Saxifraga oregana	Oregon saxifrage	SAOR
Schoenolirion album	white-flowered rush-lily	SCAL
Scirpus fluviatilis	river bullrush	SCFL
Sedum	stonecrop	SEDUM
Sedum lanceolatum	lanceleaved stonecrop	SELA2
Sedum lanceolatum lanceolatum	lanceleaved stonecrop	SELAL
Sedum oreganense	creamy stonecrop	SEOR2
Sedum purdyi	Purdy's stonecrop	SEPU2
Sedum spathulifolium	spatula-leaf stonecrop	SESP
Senecio	groundsel	SENEC
Senecio bolanderi	Bolander's groundsel	SEBO
Senecio integerrimus	western groundsel	SEIN
Senecio ligulifolius	groundsel	SELI
Senecio triangularis	arrowleaf groundsel	SETR
Sequoia sempervirens	coast redwood	SESE2
Silene campanulata	slender campion	SICA2
Silene campanulata glandulosa	slender campion	SICAG
Silene hookeri	Hocker's campion	SIHO
Sitanion hystrix	bottlebrush squirreltail	SIHY
Smilacina racemosa	western Solomon-plume	SMRA
Smilacina stellata	starry Solomon-plume	SMST
Sorbus sitchensis	Sitka mountain-ash	SOSI
Spirea douglasii	Douglas spirea	SPDO
Spraguea umbellata	pussypaws	SPUM
Stachys	hedge-nettle	STACH
Stachys mexicana	great hedge-nettle	STME2
Stipa lemmonii	Lemmon's needlegrass	STLE2
Stipa occidentalis minor	Columbia needlegrass	STOCM
Symphoricarpos albus	common snowberry	SYAL
Symphoricarpos mollis	creeping snowberry	SYMO

Appendix B. Species List by Scientific Name.

Scientific name	Common name	CODE
Synthyris reniformis	snow-queen	SYRE
Taxus brevifolia	Pacific yew	TABR
Tellima grandiflora	large-flowered fringecup	TEGR
Thlaspi fendleri	Fendler's pennycress	THFE
Thlaspi fendleri glaucum	Fendler's pennycress	THFEG
Thuja plicata	western redcedar	THPL
Tiarella trifoliata	coolwort foamflower	TITR
Tiarella trifoliata laciniata	cutleaf foamflower	TITRL
Tiarella trifoliata trifoliata	trefoil foamflower	TITRT
Tiarella trifoliata unifoliata	coolwort foamflower	TITRU
Tonella tenella	small-flowered tonella	TOTE
Trientalis latifolia	western starflower	TRLA2
Trifolium	clover	TRIFO
Trifolium eriocephalum	woolly-head clover	TRER
Trifolium longipes	long-stalked clover	TRLO
Trillium ovatum	white trillium	TROV
Trillium rivale	Oregon trillium	TRRI
Trisetum	trisetum	TRISE
Tsuga heterophylla	western hemlock	TSHE
Tsuga mertensiana	mountain hemlock	TSME
Umbellularia californica	California laurel	UMCA
Urtica dioica lyallii	Lyall nettle	URDIL
Vaccinium	huckleberry (or blueberry)	VACCI
Vaccinium membranaceum	thin-leaved huckleberry	VAME
Vaccinium ovatum	evergreen huckleberry	VAOV2
Vaccinium parvifolium	red huckleberry	VAPA
Vaccinium scoparium	grouse huckleberry	VASC
Valeriana sitchensis	mountain heliotrope	VASI
Vancouveria chrysantha	yellow inside-out-flower	VACH
Vancouveria hexandra	white inside-out-flower	VAHE
Veratrum californicum	California false hellebore	VECA
Veronica cusickii	Cusick's speedwell	VECU
Vicia	vetch	VICIA
Vicia americana	American vetch	VIAM
Vicia americana villosa	California vetch	VIAMV
Vicia sativa	common vetch	VISA
Viola	violet	VIOLA
Viola adunca	early blue violet	VIAD
Viola cuneata	wedgeleaf violet	VICU
Viola glabella	stream violet	VIGL
Viola orbiculata	round-leaved violet	VIOR2
Viola purpurea	goosefoot violet	VIPU
Viola sempervirens	redwoods violet	VISE
Vitis californica	western wild grape	VICA3
Whipplea modesta	whipplevine	WHMO
Woodwardia	chain-fern	WOODW
Woodwardia fimbriata	giant chain-fern	WOFI
Xerophyllum tenax	beargrass	XETE
Zigadenus venenosus	meadow death-camas	ZIVE

Appendix C. Species List by Code.

CODE	Scientific name	Common name
ABCO	Abies concolor	white fir
ABGR	Abies grandis	grand fir
ABLA	Abies lasiocarpa	subalpine fir
ABMAS	Abies magnifica shastensis	Shasta red fir
ACCI	Acer circinatum	vine maple
ACCO	Aconitum columbianum	Columbian monkshood
ACGL	Acer glabrum	Rocky Mountain maple
ACMA	Acer macrophyllum	bigleaf maple
ACMI	Achillea millefolium	common yarrow
ACRU	Actaea rubra	baneberry
ACTR	Achlys triphylla	vanillaleaf
ADBI	Adenocaulon bicolor	trail-plant
ADPE	Adiantum pedatum	western maidenhair-fern
AGAL	Agrostis alba	pale bentgrass
AGGR	Agoseris grandiflora	large-flowered agoseris
AGHA	Agrostis hallii	Hall's bentgrass
AGROS	Agrostis	bentgrass
AGUR	Agastache urticifolia	nettle-leaf giant-hyssop
ALFA	Allium falcifolium	sickle-leaved onion
ALLIU	Allium	wild onion
ALRU	Alnus rubra	red alder
ALSI	Alnus sinuata	sitka alder
ALSI3	Allium siskiyouense	Siskiyou onion
ALTO	Allium tolmiei	Tolmie's onion
ALVI	Allotropa virgata	candystick
AMAL	Amelanchier alnifolia	western serviceberry
ANAPH	Anaphalis	pearly-everlasting
ANAR2	Angelica arguta	sharptooth angelica
ANDE	Anemone deltoidea	threeleaf anemone
ANDR	Anemone drummondii	Drummond's anemone
ANLY2	Anemone lyallii	Lyall's anemone
ANMA	Anaphalis margaritacea	common pearly-everlasting
ANNE2	Antennaria neglecta	field everlasting
ANSU	Antennaria suffretescens	shrubby everlasting
APAN	Apocynum androsaemifolium	spreading dogbane
AQFO	Aquilegia formosa	red columbine
ARABI	Arabis	rockcress
ARAC	Arabis aculeolata	wall rockcress
ARALI	Aralia	wild sarsaparilla
ARCI	Arctostaphylos cinera	gray manzanita
ARCO	Arnica cordifolia	heart-leafed arnica
ARCO3	Arctostaphylos columbiana	hairy manzanita
ARDI	Arnica discoidea	rayless arnica
AREL	Arrhenatherum elatus	tall oatgrass
ARENA	Arenaria	sandwort
ARGL	Arabis glabra	towermustard
ARHI	Arabis hirsuta	hairy rockcress
ARHO	Arabis holboellii	Holboell's sandwort
ARLA	Arnica latifolia	broad-leafed arnica

Appendix C. Species List by Code.

CODE	Scientific name	Common name
ARLU	Artemisia ludoviciana	western mugwort
ARMA3	Arenaria macrophylla	bigleaf sandwort
ARME	Arbutus menziesii	Pacific madrone
ARNE	Arctostaphylos nevadensis	pinemat manzanita
ARNIC	Arnica	arnica
ARNU	Arenaria nuttallii	Nuttall's sandwort
AROR	Arabis oregana	Oregon rockcress
ARPA	Arctostaphylos patula	greenleaf manzanita
ARPA3	Arnica parryi	nodding arnica
ARPL	Arabis platysperma	flatseed rockcress
ARPLH	Arabis platysperma howellii	Howell's rockcress
ARPU	Arabis puberula	hoary rockcress
ARSY	Aruncus sylvester	Sylvan goatsbeard
ARTH	Arabidopsis thaliana	Thale cress
ARTR	Artemisia tridentata	big sagebrush
ARVI	Arctostaphylos viscida	whiteleaf manzanita
ASBR	Aster brickellioides	aster
ASBRG	Aster brickellioides glabratus	aster
ASCA3	Asarum caudatum	wild ginger
ASCO	Aster conspicuus	showy aster
ASDE	Aspidotis densa	cliff-brake
ASHA	Asarum hartwegii	marbled wild ginger
ASTRA	Astragalus	locoweed
ASWH	Astragalus whitneyi	balloon milk-vetch
ATFI	Athyrium filix-femina	lady-fern
BADE	Balsamorhiza deltoidea	deltoid balsamroot
BALSA	Balsamorhiza	balsamroot
BAMI	Baeria minor	small goldfields
BEAQ	Berberis aquifolium	tall Oregongrape
BENE	Berberis nervosa	dwarf Oregongrape
BEOR	Bensoniella oregana	Oregon bensonia
BEPI	Berberis piperiana	Piper's Oregongrape
BEPU	Berberis pumila	pygmy hollygrape
BERE	Berberis repens	creeping Oregongrape
BLSC	Blepharipappus scaber	blepharipappus
BLSP	Blechnum spicant	deer-fern
BOEL	Boykina elata	slender boykinia
BOMA	Boykinia major	mountain boykinia
BOST2	Boschniakia strobilacea	ground-cone
BRCA	Bromus carinatus	California brome
BRCO3	Brodiaea congesta	Columbia brodiaea
BREL	Brodiaea elegans	elegant brodiaea
BRHE	Brodiaea hendersonii	Henderson's brodiaea
BRID	Brodiaea ida-maia	fire-cracker brodiaea
BRODI	Brodiaea	brodiaea
BROMU	Bromus	brome
BRPA	Bromus pacificus	Pacific brome
BRSU	Bromus suksdorfii	Suksdorf's brome
BRTE	Bromus tectorum	cheatgrass brome

Appendix C. Species List by Code.

CODE	Scientific name	Common name
BRVU	Bromus vulgaris	Columbia brome
CAAP2	Castilleja applegatei	Applegate's paintbrush
CAAPA	Castilleja applegatei applegatei	Applegate's paintbrush
CABIB	Caltha biflora biflora	white marshmarigold
CABU2	Calypso bulbosa	fairy-slipper
CACH	Castanopsis chrysophylla	golden chinquapin
CACO	Carex concinnoides	northwestern sedge
CADE3	Calocedrus decurrens	incense-cedar
CAFE2	Carex feta	greensheathed sedge
CAHA2	Carex halliana	Hall's sedge
CAHO	Carex hoodii	Hood's sedge
CAJO	Carex jonesii	Jones' sedge
CAKO	Camagrostis koelerioides	fire reedgrass
CALI	Carex limosa	mud sedge
CAMAS	Camassia	camas
CAPE5	Carex pensylvanica	long stolon sedge
CAPR3	Campanula prenanthoides	California harebell
CAPU	Cardamine pulcherrima	slender toothwort
CAPUP	Cardamine pulcherrima pulcherrima	slender toothwort
CAPUT	Cardamine pulcherrima tenella	slender toothwort
CAQU	Camassia quamash	common camas
CAREX	Carex	sedge
CASC2	Campanula scouleri	Scouler's harebell
CASTI	Castilleja	paintbrush
CATO	Calochortus tolmiei	Tolmie's cats-ear
CEAR	Cerastium arvense	field chickweed
CECU	Ceanothus cuneatus	wedgeleaf ceanothus
CEIN	Ceanothus integerrimus	deerbrush ceanothus
CELE	Cercocarpus ledifolius	curl-leaf mountain-mahogany
CEMO	Cercocarpus montanus	birch-leaf mountain-mahogany
CEPR	Ceanothus prostratus	squawcarpet ceanothus
CEPU	Ceanothus pumilus	dwarf ceanothus
CESA	Ceanothus sanguineus	redstem ceanothus
CETH	Ceanothus thyrsiflorus	blue blossom ceanothus
CEVE	Ceanothus velutinus	snowbrush ceanothus
CHDO	Chaenactis douglasii	hoary falseyarrow
CHLA	Chamaecyparis lawsoniana	Port-Orford-cedar
CHME	Chimaphila menziesii	little prince's-pine
CHNA	Chrysothamnus nauseosus	tall gray rabbitbrush
CHNO	Chamaecyparis nootkatensis	Alaska-cedar
CHUM	Chimaphila umbellata	western prince's-pine
CIAL	Circaea alpina	alpine enchanter's nightshade
CLGR	Clarkia gracilis	slender godetia
CLPU2	Clarkia purpurea	purple godetia
CLRH	Clarkia rhomboidea	rhombic-petaled clarkia
CLUN	Clintonia uniflora	Queen's cup
COCOC	Corylus cornuta californica	California hazel
COGR	Collinsia grandiflora	large-flowered blue-eyed Mary
COHE	Collomia heterophylla	varied-leaf collomia

Appendix C. Species List by Code.

CODE	Scientific name	Common name
COLA	Coptis laciniata	cutleaf goldthread
COMA3	Corallorhiza maculata	spotted coral-root
COME	Corallorhiza mertensiana	western coral-root
CONU	Cornus nuttallii	Pacific dogwood
COPA	Collinsia parviflora	small-flowered blue-eyed Mary
COPO	Convolvulus polymorphus	variable morning-glory
CORA2	Collinsia rattanii	Rattan blue-eyed Mary
CORAL	Corallorhiza	coral-root
COST	Cornus stolonifera	red-osier dogwood
COST2	Corallorhiza striata	striped coral-root
COSU	Convolvulus subacaulis	stemless morning glory
CRAC	Crepis acuminata	long-leaved hawksbeard
CRCR	Cryptogramma crispa	parsley-fern
CRPL	Crepis pleurocarpa	naked-stemmed hawksbeard
CRSI	Cryptantha simulans	pine woods cryptantha
CYEC	Cynosorus echinatus	hedgehog dogtail
CYGR	Cynoglossum grande	Pacific hound's-tongue
CYOC	Cynoglossum occidentale	western hound's-tongue
DACA	Danthonia californica	california oatgrass
DECA	Deschampsia caespitosa	tufted hairgrass
DEDA	Deschampsia danthonioides	annual hairgrass
DELPH	Delphinium	larkspur
DEPI	Descurainia pinnata	western tansymustard
DIFO	Dicentra formosa	Pacific bleedingheart
DIFOO	Dicentra formosa oregona	Oregon bleedingheartt
DIHOO	Disporum hookerii oreganum	Oregon fairy-bell
DISM	Disporum smithii	Smith fairy-bell
DOHE	Dodecatheon hendersonii	Henderson's shooting star
DRAU2	Dryopteris austriaca	mountain woodfern
EBAU	Eburophyton austinae	phantom-orchid
ELGL	Elymus glaucus	blue wildrye
ELYMU	Elymus	wildrye
EPAN	Epilobium angustifolium	fireweed
EPILO	Epilobium	willow-herb
EPMI	Epilobium minutum	samll-flowered willow-herb
EPPA	Epilobium paniculatum	autumn willow-herb
EPRI	Epilobium rigidum	rigid willow-herb
EQAR	Equisetum arvense	common horsetail
ERAL	Erigeron aliceae	Alice fleabane
ERAS	Erysimum asperum	rough wallflower
EREL2	Eriogonum elatum	tall buckwheat
ERGR	Erythronium grandiflorum	pale fawn-lily
ERGRG	Erythronium grandiflorum grandiflorum	yellow fawn-lily
ERHE2	Erythronium hendersonii	Henderson's fawn-lily
ERHO2	Erythronium howellii	Howell's fawn-lily
ERIGE	Erigeron	fleabane (or daisy)
ERIOG	Eriogonum	buckwheat
ERLA	Eriophyllum lanatum	woolly sunflower
ERLI	Erigeron linearis	line-leaf fleabane

Appendix C. Species List by Code.

CODE	Scientific name	Common name
ERNU	Eriogonum nudum	barestem buckwheat
ERPYC	Erigonum pyrolifolium coryphaeum	alpine buckwheat
ERUM	Eriogonum umbellatum	sulphur buckwheat
ERUMP	Eriogonum umbellatum polyanthum	sulphur buckwheat
ERUMS	Eriogonum umbellatum stellatum	sulphur buckwheat
ERVI	Eriogonum vimineum	broom buckwheat
FECA	Festuca californica	Californic fescue
FEID	Festuca idahoensis	Idaho fescue
FEOC	Festuca occidentalis	western fescue
FEOV	Festuca ovina	sheep fescue
FEPR	Festuca pratensis	meadow fescue
FERU	Festuca rubra	red fescue
FESTU	Festuca	fescue
FESU	Festuca subulata	bearded fescue
FESU2	Festuca subuliflora	crinkleawn fescue
FOVU	Foeniculum vulgare	sweet fennel
FRAGA	Fragaria	strawberry
FRALN	Frasera albicaulis nitida	shiny frasera
FRAT	Fritillaria atropurpurea	checker lily
FRLA	Fritillaria lanceolata	checker lily
FRLA2	Fraxinus latifolia	Oregon ash
FRPU	Fritillaria pudica	yellow bell
FRSP	Frasera speciosa	giant frasera
FRVEB	Fragaria vesca bracteata	woods strawberry
GAAM	Galium ambiguum	obscure bedstraw
GAAP	Galium aparine	cleavers bedstraw
GABI	Galium bifolium	thinleaf bedstraw
GABO	Galium bolanderi	Bolander's bedstraw
GABU	Garrya buxifolia	box-leaved silktassel
GAFR	Garrya fremontii	Fremont silktassel
GAOR	Galium oreganum	Oregon bedstraw
GAOV	Gaultheria ovatifolia	slender salal
GASH	Gaultheria shallon	salal
GATR	Galium trifidum	small bedstraw
GAVE2	Gastridium ventricosum	nitgrass asera
GEMA	Geum macrophyllum	Oregon avens
GENTI	Gentiana	gentian
GERAN	Geranium	crane's-bill
GESI	Gentiana simplex	one-flowered gentian
GIAG	Gilia aggregata	scarlet gilia
GICA	Gilia capitata	bluefield gilia
GOOB	Goodyeara oblongifolia	western rattlesnake-plantain
HADE	Hackelia deflexa	nodding stickseed
HADI2	Habenaria dilatata	white bog-orchid
HAEL	Habenaria elegans	elegant bog-orchid
HAPLO2	Haplopappus	happlopappus
HAUN	Habenaria unalascensis	Alaska bog-orchid
HECO	Hemitomes congestum	gnome-plant
HELA	Heracleum lanatum	common cow-parsnip

Appendix C. Species List by Code.

CODE	Scientific name	Common name
HEMI	Heuchera micrantha	smallflower alumroot
HEMIM	Heuchera micrantha micrantha	smallflower alumroot
HIAL	Hieracium albiflorum	white-flowered hawkweed
HIGR2	Hieracium greenei	Green's hawkweed
HIOC	Hierochloe occidentalis	California sweetgrass
HODI	Holodiscus discolor	creambush oceanspray
HOSE	Horkelia sericata	silky horkelia
HYCA	Hydrophyllum capitatum	ballhead waterleaf
HYCAA	Hydrophyllum capitatum alpinum	alpine waterleaf
HYCAC	Hydrophyllum capitatum capitatum	dwarf waterleaf
HYDRO	Hydrophyllum	waterleaf
HYFEA	Hydrophyllum fendleri albifrons	whiteleaf Fendler's waterleaf
HYMO	Hypopitys monotropas	pinesap
HYOC	Hydrophyllum occidentale	California waterleaf
HYPE	Hypericum perforatum	common St John's-wort
HYTE	Hydrophyllum tenuipes	Pacific waterleaf
IRCH	Iris chrysophylla	slender-tubed iris
IRTE	Iris tenax	Oregon iris
IRTEK	Iris tenax klamathensis	Klamath iris
JUCO4	Juniperus communis	common juniper
JUPA	Juncus parryi	Parry's rush
KALMI	Kalmia	laurel
KOCR	Koelaria cristata	prairie junegrass
LAPO	Lathyrus polyphyllus	leafy peavine
LATHY	Lathyrus	peavine
LEDA	Leucothoe davisiae	Sierra laurel
LELA	Lepidium latifolium	pepperwort
LELE	Lewisia leana	many-flowered lewisia
LIAP	Ligusticum apiifolium	celery-leaved licorice-root
LIBO3	Lilium bolanderi	Bolander's lily
LIBOL	Linnaea borealis longiflora	western twinflower
LICA3	Listera caurina	western twayblade
LICO3	Listera cordata	heart-leaf twayblade
LIDE3	Lithocarpus densiflorus	tanoak
LILE	Linum lewisii	western blue flax
LILIU	Lilium	lily
LIPA	Lithophragma parviflora	smallflower fringecup
LIPEL	Linum perenne lewisii	Lewis's flax
LISTE	Listera	twayblade
LIWA	Lilium washingtonianum	Washington lily
LOCI	Lonicera ciliosa	orange honeysuckle
LOCO	Lonicera conjugialis	purple-flower honeysuckle
LOCR	Lotus crassifolius	big deervetch
LOHI	Lonicera hispidula	hairy honeysuckle
LOMA2	Lomatium martindalei	Martindale's biscuit-root
LOMAT	Lomatium	biscuit-root
LOMI	Lotus micranthus	small-flowered deervetch
LONIC	Lonicera	honeysuckle
LOTR	Lomatium triternatum	nine-leaf biscuit- root

Appendix C. Species List by Code.

CODE	Scientific name	Common name
LOTRT	Lomatium triternatum triternatum	nine-leaf biscuit-root
LOTUS	Lotus	deervetch
LOUT	Lomatium utriculatum	common deervetchuit-root
LUAL	Lupinus albicaulis	sickle-keeled lupine
LUAL2	Lupinus albifrons	white-leaved lupine
LUBI	Lupinus bicolor	two-color lupine
LULE	Lupinus leucophyllus	velvet lupine
LUPA	Luzula parviflora	small flowered woodrush
LUPIN	Lupinus	lupine
LUPOP	Lupinus polyphyllus pallidipes	bigleaf lupine
MAEL	Madia elegans	showy tarweed
MAMA	Madia madioides	woodland tarweed
MEAR	Melica aristata	bearded oniongrass
MEBE	Mertensia bella	Oregon bluebells
MEFE	Menziesia ferruginea	rusty menziesia
MEGE	Melica geyeri	Geyer's oniongrass
MELIC	Melica	oniongrass
MEOF2	Melissa officinalis	bee balm
MESU	Melica subulata	Alaska oniongrass
MIAL	Mimulus alsinoides	chickweed monkey-flower
MIGU	Mimulus guttatus	yellow monkey-flower
MIMUL	Mimulus	monkey-flower
MITEL	Mitella	mitrewort
MITR2	Mitella trifida	three-tooth mitrewort
MODI	Montia dichotoma	dwarf montia
MOHY	Monotropa hypopithys	pinesap
MONTI	Montia	montia
MOOD	Monardella odoratissima	mountain monardella
MOPA	Montia parvifolia	littleleaf montia
MOPE	Montia perfoliata	miner's lettuce
MOPED	Montia perfoliata depressa	miner's lettuce
MOSI	Montia sibirica	Siberian montia
MOSIB	Montia sibirica bulbifera	Siberian montia
MOSIS	Montia sibirica sibirica	Siberian montia
MOSP	Montia spathulata	pale montia
MOUN2	Monotropa uniflora	Indian-pipe
NEHE	Nemophila heterophylla	varied-leaf nemophila
NEPA	Nemophila parviflora	small-flowered nemophila
NONE	Nothochelone nemorosa	woodland beard-tongue
OECE	Oemelaria cerasiformis	Indian plum
ORCR	Orthocarpus cryptanthus	broad-scaled owl-clover
ORCU	Orthocarpus cuspidatus	broad-scaled owl-clover
ORFA2	Orobanche fasiculata	clustered broomrape
ORHI	Orthocarpus hispidus	hairy owl-clover
ORIM	Orthocarpus imbricatus	mountain owl-clover
ORPU	Orthocarpus pusillus	dwarf owl-clover
ORUN	Orobanche uniflora	naked broomrape
OSCH	Osmorhiza chilensis	mountain sweet-root
OSOC	Osmorhiza occidentalis	western sweet-root

Appendix C. Species List by Code.

CODE	Scientific name	Common name
OSPU	Osmorhiza purpurea	purple sweet-root
OXOR	Oxalis oregana	Oregon wood-sorrel
OXSU	Oxalis suksdorfii	western yellow wood-sorrel
OXTR	Oxalis trilliifolia	great wood-sorrel
PAMY	Pachistima myrsinites	Oregon boxwood
PEAN	Penstemon anguineus	tongue-leaved penstemon
PEAZ	Penstemon azureus	azure penstemon
PEDE	Penstemon deustus	hot-rock penstemon
PEFR2	Petasites frigidus	alpine coltsfoot
PEHO	Pedicularis howellii	Howell's pedicularis
PELE2	Penstemon lemmonii	Lemmon's penstemon
PENE	Penstemon newberryi	newberry's penstemon
PENST	Penstemon	penstemon
PEPA3	Penstemon parvulus	penstemon
PERA	Pedicularis racemosa	leafy pedicularis
PHAD	Phlox adsurgens	woodland phlox
PHALA	Phalaris	canarygrasscelia
PHCA3	Physocarpus capitatus	Pacific ninebark
PHCO3	Phacelia corymbosa	phacelia
PHDI	Phlox diffusa	spreading phlox
PHHA	Phacelia hastata	whiteleaf phacelia
PHHE	Phacelia heterophylla	varileaf phacelia
PHHEP	Phacelia heterophylla pseudohispida	varileaf phacelia
PHLE2	Philadelphus lewisii	Lewis mockorange
PHPR	Phleum pratense	common timothy
PHSP	Phlox speciosa	showy phlox
PIAT	Pinus attenuata	knobcone pine
PIBR	Picea breweriana	Brewer spruce
PICA	Pityopus californica	pine-foot
PICO	Pinus contorta	lodgepole pine
PIJE	Pinus jeffreyi	Jeffrey pine
PILA	Pinus lambertiana	sugar pine
PIMO	Pinus monticola	western white pine
PIPO	Pinus ponderosa	ponderosa pine
PLNO	Plagiobothrys nothofulvus	rusty popcorn-flower
POA	Poa	bluegrass
POBI	Polygonum bistortoides	snakeweed
POBU	Poa bulbosa	bulbous bluegrass
POCA2	Polemonium carneum	great polemonium
POCA5	Polygonum cascadense	Cascadian knotweed
POCA8	Polygala californica	California milkwort
POGL	Potentilla glandulosa	sticky cinquefoil
POGLG	Potenitilla glandulosa glandulosa	sticky cinquefoil
POGLN	Potentilla glandulosa nevadensis	Nevada cinquefoil
POGR	Potentilla gracilis	common cinquefoil
POHE2	Polypodium hesperium	Columbia licorice-fern
POLE2	Poa leibergii	Leiberg's bluegrass
POLYG	Polygonum	doorweed (or knotweed)
POLYP	Polypodium	polypody

Appendix C. Species List by Code.

CODE	Scientific name	Common name
POLYS	Polystichum	sword-fern
POMO3	Polystichum mohriodes	Shasta fern
POMU	Polystichum munitum	sword-fern
POPA	Poa palustris	fowl bluegrass
POPH	Polygonum phytolaccaefolium	alpine knotweed
POPR	Poa pratensis	Kentucky bluegrass
POPU	Polemonium pulcherrimum	skunkleaf polemonium
POQU	Potentilla quinquefolia	snow cinquefoil
POSA3	Poa sandbergii	Sandberg's bluegrass
POSC	Poa scabrella	pine bluegrass
POSC2	Polygonum scandens	hedge cornbind
POTEN	Potentilla	cinquefoil
PREM	Prunus emarginata	bitter cherry
PRVI	Prunus virginiana	common chokecherry
PSME	Pseudotsuga menziesii	Douglas-fir
PSPH	Psoralea physodes	California-tea
PTAN	Pterospora andromedea	pinedrops
PTAQ	Pteridium aquilinum	braken
PUTR	Purshia tridentata	antelope bitterbrush
PYAP	Pyrola aphylla	leafless pyrola
PYAS	Pyrola assarifolia	alpine pyrola
PYASP	Pyrola assarifolia purpurea	liver-leaf pyrola
PYDE	Pyrola dentata	toothleaf pyrola
PYPI	Pyrola picta	white vein pyrola
PYSE	Pyrola secunda	one-sided pyrola
QUCH	Quercus chrysolepis	canyon live oak
QUGA	Quercus garryana	Oregon white oak
QUKE	Quercus kelloggii	California black oak
QUSA	Quercus sadleriana	Sadler oak
QUVA	Quercus vaccinifolia	huckleberry oak
RAALA	Ranunculus alismaefolius alismellus	dwarf plaintainleaf buttercup
RAOC	Ranunculus occidentalis	western buttercup
RAOCO	Ranunculus occidentalis occidentalis	western buttercup
RHCA	Rhamnus californica	California coffeeberry
RHDI	Rhus diversiloba	poison oak
RHMA	Rhododendron macrophyllum	Pacific rhododendron
RHOC	Rhododendron occidentale	western azalea
RHPU	Rhamnus purshiana	cascara
RIBES	Ribes	gooseberry (or currant)
RIBI	Ribes binominatum	Siskiyou gooseberry
RICE	Ribes cereum	wax currant
RICR	Ribes cruentum	shinyleaf gooseberry
RILA	Ribes lacustre	prickly currant
RILO	Ribes lobbii	Lobb's gooseberry
RIMA	Ribes marshallii	Applegate gooseberry
RISA	Ribes sanguineum	red-flowering currnat
RIVE	Ribes velutinum	desert gooseberry
RIVI	Ribes viscosissimum	sticky currant
ROGY	Rosa gymnocarpa	baldhip rose

Appendix C. Species List by Code.

CODE	Scientific name	Common name
ROSA	Rosa	rose
RUBUS	Rubus	blackberry (or bramble)
RULA	Rubus lasiococcus	dwarf blackberry
RULE	Rubus leucodermis	blackcap
RUNI	Rubus nivalis	snow bramble
RUOC2	Rumex occidentalis	western dock
RUPA	Rubus parviflorus	thimbleberry
RUSP	Rubus spectabilis	salmonberry
RUUR	Rubus ursinus	trailing blackberry
SAAR5	Sambucus arborescens	red elderberry
SACE	Sambucus cerulea	blue elderberry
SADO	Satureja douglasii	yerba buena
SALIX	Salicaceae	willow
SAMBU	Sambucus	elderberry
SAME3	Saxifraga mertensiana	wood saxifrage
SAOR	Saxifraga oregana	Oregon saxifrage
SARA	Sambucus racemosa	red elderberry
SARAA	Sambucus racemosa arborescens	red elderberry
SASA2	Sarcodes sanguinea	snow plant
SAXIF	Saxifraga	saxifrage
SCAL	Schoenolirion album	white-flowered rush-lily
SCFL	Scirpus fluviatilis	river bullrush
SEBO	Senecio bolanderi	Bolander's groundsel
SEDUM	Sedum	stonecrop
SEIN	Senecio integerrimus	western groundsel
SELA2	Sedum lanceolatum	lanceleaved stonecrop
SELAL	Sedum lanceolatum lanceolatum	lanceleaved stonecrop
SELI	Senecio ligulifolius	groundsel
SENEC	Senecio	groundsel
SEOR2	Sedum oreganense	creamy stonecrop
SEPU2	Sedum purdyi	Purdy's stonecrop
SESE2	Sequoia sempervirens	coast redwood
SESP	Sedum spathulifolium	spatula-leaf stonecrop
SETR	Senecio triangularis	arrowleaf groundsel
SICA2	Silene campanulata	slender campion
SICAG	Silene campanulata glandulosa	slender campion
SIHO	Silene hookeri	Hooker's campion
SIHY	Sitanion hystrix	bottlebrush squirreltail
SMRA	Smilacina racemosa	western Solomon-plume
SMST	Smilacina stellata	starry Solomon-plume
SOSI	Sorbus sitchensis	Sitka mountain-ash
SPDO	Spirea douglasii	Douglas spirea
SPUM	Spraguea umbellata	pussypaws
STACH	Stachys	hedge-nettle
STLE2	Stipa lemmonii	Lemmon's needlegrass
STME2	Stachys mexicana	great hedge-nettle
STOCM	Stipa occidentalis minor	Columbia needlegrass
SYAL	Symphoricarpos albus	common snowberry
SYMO	Symphoricarpos mollis	creeping snowberry

Appendix C. Species List by Code.

CODE	Scientific name	Common name
SYRE	Synthyris reniformis	snow-queen
TABR	Taxus brevifolia	Pacific yew
TEGR	Tellima grandiflora	large-flowered fringecup
THFE	Thlaspi fendleri	Fendler's pennycress
THFEG	Thlaspi fendleri glaucum	Fendler's pennycress
THPL	Thuja plicata	western redcedar
TITR	Tiarella trifoliata	coolwort foamflower
TITRL	Tiarella trifoliata laciniata	cutleaf foamflower
TITRT	Tiarella trifoliata trifoliata	trefoil foamflower
TITRU	Tiarella trifoliata unifoliata	coolwort foamflower
TOTE	Tonella tenella	small-flowered tonella
TRER	Trifolium eriocephalum	woolly-head clover
TRIFO	Trifolium	clover
TRISE	Trisetum	trisetum
TRLA2	Trientalis latifolia	western starflower
TRLO	Trifolium longipes	long-stalked clover
TROV	Trillium ovatum	white trillium
TRRI	Trillium rivale	Oregon trillium
TSHE	Tsuga heterophylla	western hemlock
TSME	Tsuga mertensiana	mountain hemlock
UMCA	Umbellularia californica	California laurel
URDIL	Urtica dioica lyallii	Lyall nettle
VACCI	Vaccinium	huckleberry (or blueberry)
VACH	Vancouveria chrysantha	yellow inside-out-flower
VAHE	Vancouveria hexandra	white inside-out-flower
VAME	Vaccinium membranaceum	thin-leaved huckleberry
VAOV2	Vaccinium ovatum	evergreen huckleberry
VAPA	Vaccinium parvifolium	red huckleberry
VASC	Vaccinium scoparium	grouse huckleberry
VASI	Valeriana sitchensis	mountain heliotrope
VECA	Veratrum californicum	California false hellebore
VECU	Veronica cusickii	Cusick's speedwell
VIAD	Viola adunca	early blue violet
VIAM	Vicia americana	American vetch
VIAMV	Vicia americana villosa	California vetch
VICA3	Vitis californica	western wild grape
VICIA	Vicia	vetch
VICU	Viola cuneata	wedgeleaf violet
VIGL	Viola glabella	stream violet
VIOLA	Viola	violet
VIOR2	Viola orbiculata	round-leaved violet
VIPU	Viola purpurea	goosefoot violet
VISA	Vicia sativa	common vetch
VISE	Viola sempervirens	redwoods violet
WHMO	Whipplea modesta	whipplevine
WOFI	Woodwardia fimbriata	giant chain-fern
WOODW	Woodwardia	chain-fern
XETE	Xerophyllum tenax	beargrass
ZIVE	Zigadenus venenosus	meadow death-camas

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
Alaska bog-orchid	Habenaria unalascensis	HAUN
Alaska oniongrass	Melica subulata	MESU
Alaska-cedar	Chamaecyparis nootkatensis	CHNO
Alice fleabane	Erigeron aliceae	ERAL
alpine buckwheat	Erigonum pyrolifolium coryphaeum	ERPYC
alpine coltsfoot	Petasites frigidus	PEFR2
alpine enchanter's nightshade	Circaea alpina	CIAL
alpine knotweed	Polygonum phytolaccaefolium	POPH
alpine pyrola	Pyrola assarifolia	PYAS
alpine waterleaf	Hydrophyllum capitatum alpinum	HYCAA
American vetch	Vicia americana	VIAM
annual hairgrass	Deschampsia danthonioides	DEDA
antelope bitterbrush	Purshia tridentata	PUTR
Applegate gooseberry	Ribes marshallii	RIMA
Applegate's paintbrush	Castilleja applegatei	CAAP2
Applegate's paintbrush	Castilleja applegatei applegatei	CAAPA
arnica	Arnica	ARNIC
arrowleaf groundsel	Senecio triangularis	SETR
aster	Aster brickellioides	ASBR
aster	Aster brickellioides glabratus	ASBRG
autumn willow-herb	Epilobium paniculatum	EPPA
azure penstemon	Penstemon azureus	PEAZ
baldhip rose	Rosa gymnocarpa	ROGY
ballhead waterleaf	Hydrophyllum capitatum	HYCA
balloon milk-vetch	Astragalus whitneyi	ASWH
balsamroot	Balsamorhiza	BALSA
baneberry	Actaea rubra	ACRU
barestem buckwheat	Eriogonum nudum	ERNU
bearded fescue	Festuca subulata	FESU
bearded oniongrass	Melica aristata	MEAR
beargrass	Xerophyllum tenax	XETE
bee balm	Melissa officinalis	MEOF2
bentgrass	Agrostis	AGROS
big deervetch	Lotus crassifolius	LOCR
big sagebrush	Artemisia tridentata	ARTR
bigleaf lupine	Lupinus polyphyllus pallidipes	LUPOP
bigleaf maple	Acer macrophyllum	ACMA
bigleaf sandwort	Arenaria macrophylla	ARMA3
birch-leaf mountain-mahogany	Cercocarpus montanus	CEMO
biscuit-root	Lomatium	LOMAT
bitter cherry	Prunus emarginata	PREM
blackberry (or bramble)	Rubus	RUBUS
blackcap	Rubus leucodermis	RULE
blepharipappus	Blepharipappus scaber	BLSC
blue blossom ceanothus	Ceanothus thyrsiflorus	CETH
blue elderberry	Sambucus cerulea	SACE
blue wildrye	Elymus glaucus	ELGL
bluefield gilia	Gilia capitata	GICA
bluegrass	Poa	POA

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
Bolander's bedstraw	Galium bolanderi	GABO
Bolander's groundsel	Senecio bolanderi	SEBO
Bolander's lily	Lilium bolanderi	LIBO3
bottlebrush squirreltail	Sitanion hystrix	SIHY
box-leaved silktassel	Garrya buxifolia	GABU
braken	Pteridium aquilinum	PTAQ
Brewer spruce	Picea breweriana	PIBR
broad-leafed arnica	Arnica latifolia	ARLA
broad-scaled owl-clover	Orthocarpus cryptanthus	ORCR
broad-scaled owl-clover	Orthocarpus cuspidatus	ORCU
brodiaea	Brodiaea	BRODI
brome	Bromus	BROMU
broom buckwheat	Eriogonum vimineum	ERVI
buckwheat	Eriogonum	ERIOG
bulbous bluegrass	Poa bulbosa	POBU
California black oak	Quercus kelloggii	QUKE
California brome	Bromus carinatus	BRCA
California coffeeberry	Rhamnus californica	RHCA
California false hellebore	Veratrum californicum	VECA
California harebell	Campanula prenanthoides	CAPR3
California hazel	Corylus cornuta californica	COCOC
California laurel	Umbellularia californica	UMCA
California milkwort	Polygala californica	POCA8
california oatgrass	Danthonia californica	DACA
California sweetgrass	Hierochloe occidentalis	HIOC
California vetch	Vicia americana villosa	VIAMV
California waterleaf	Hydrophyllum occidentale	HYOC
California-tea	Psoralea physodes	PSPH
Californic fescue	Festuca californica	FECA
camas	Camassia	CAMAS
canarygrasscelia	Phalaris	PHALA
candystick	Allotropa virgata	ALVI
canyon live oak	Quercus chrysolepis	QUCH
Cascadian knotweed	Polygonum cascadense	POCA5
cascara	Rhamnus purshiana	RHPU
celery-leaved licorice-root	Ligusticum apiifolium	LIAP
chain-fern	Woodwardia	WOODW
cheatgrass brome	Bromus tectorum	BRTE
checker lily	Fritillaria atropurpurea	FRAT
checker lily	Fritillaria lanceolata	FRLA
chickweed monkey-flower	Mimulus alsinoides	MIAL
cinquefoil	Potentilla	POTEN
cleavers bedstraw	Galium aparine	GAAP
cliff-brake	Aspidotis densa	ASDE
clover	Trifolium	TRIFO
clustered broomrape	Orobanche fasiculata	ORFA2
coast redwood	Sequoia sempervirens	SESE2
Columbia brodiaea	Brodiaea congesta	BRCO3
Columbia brome	Bromus vulgaris	BRVU

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
Columbia licorice-fern	Polypodium hesperium	POHE2
Columbia needlegrass	Stipa occidentalis minor	STOCM
Columbian monkshood	Aconitum columbianum	ACCO
common camas	Camassia quamash	CAQU
common chokecherry	Prunus virginiana	PRVI
common cinquefoil	Potentilla gracilis	POGR
common cow-parsnip	Heracleum lanatum	HELA
common deervetchuit-root	Lomatium utriculatum	LOUT
common horsetail	Equisetum arvense	EQAR
common juniper	Juniperus communis	JUCO4
common pearly-everlasting	Anaphalis margaritacea	ANMA
common snowberry	Symphoricarpos albus	SYAL
common St John's-wort	Hypericum perforatum	HYPE
common timothy	Phleum pratense	PHPR
common vetch	Vicia sativa	VISA
common yarrow	Achillea millefolium	ACMI
coolwort foamflower	Tiarella trifoliata	TITR
coolwort foamflower	Tiarella trifoliata unifoliata	TITRU
coral-root	Corallorhiza	CORAL
crane's-bill	Geranium	GERAN
creambush oceanspray	Holodiscus discolor	HODI
creamy stonecrop	Sedum oreganense	SEOR2
creeping Oregongrape	Berberis repens	BERE
creeping snowberry	Symphoricarpos mollis	SYMO
crinkleawn fescue	Festuca subuliflora	FESU2
curl-leaf mountain-mahogany	Cercocarpus ledifolius	CELE
Cusick's speedwell	Veronica cusickii	VECU
cutleaf foamflower	Tiarella trifoliata laciniata	TITRL
cutleaf goldthread	Coptis laciniata	COLA
deer-fern	Blechnum spicant	BLSP
deerbrush ceanothus	Ceanothus integerrimus	CEIN
deervetch	Lotus	LOTUS
deltoid balsamroot	Balsamorhiza deltoidea	BADE
desert gooseberry	Ribes velutinum	RIVE
doorweed (or knotweed)	Polygonum	POLYG
Douglas spirea	Spirea douglasii	SPDO
Douglas-fir	Pseudotsuga menziesii	PSME
Drummond's anemone	Anemone drummondii	ANDR
dwarf blackberry	Rubus lasiococcus	RULA
dwarf ceanothus	Ceanothus pumilus	CEPU
dwarf montia	Montia dichotoma	MODI
dwarf Oregongrape	Berberis nervosa	BENE
dwarf owl-clover	Orthocarpus pusillus	ORPU
dwarf plaintainleaf buttercup	Ranunculus alismaefolius alismellus	RAALA
dwarf waterleaf	Hydrophyllum capitatum capitatum	HYCAC
early blue violet	Viola adunca	VIAD
elderberry	Sambucus	SAMBU
elegant bog-orchid	Habenaria elegans	HAEL
elegant brodiaea	Brodiaea elegans	BREL

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
evergreen huckleberry	Vaccinium ovatum	VAOV2
fairy-slipper	Calypso bulbosa	CABU2
Fendler's pennycress	Thlaspi fendleri	THFE
Fendler's pennycress	Thlaspi fendleri glaucum	THFEG
fescue	Festuca	FESTU
field chickweed	Cerastium arvense	CEAR
field everlasting	Antennaria neglecta	ANNE2
fire reedgrass	Camagrostis koelèrioides	CAKO
fire-cracker brodiaea	Brodiaea ida-maia	BRID
fireweed	Epilobium angustifolium	EPAN
flatseed rockcress	Arabis platysperma	ARPL
fleabane (or daisy)	Erigeron	ERIGE
fowl bluegrass	Poa palustris	POPA
Fremont silktassel	Garrya fremontii	GAFR
gentian	Gentiana	GENTI
Geyer's oniongrass	Melica geyeri	MEGE
giant chain-fern	Woodwardia fimbriata	WOFI
giant frasera	Frasera speciosa	FRSP
gnome-plant	Hemitomes congestum	HECO
golden chinquapin	Castanopsis chrysophylla	CACH
gooseberry (or currant)	Ribes	RIBES
goosefoot violet	Viola purpurea	VIPU
grand fir	Abies grandis	ABGR
gray manzanita	Arctostaphylos cinera	ARCI
great hedge-nettle	Stachys mexicana	STME2
great polemonium	Polemonium carneum	POCA2
great wood-sorrel	Oxalis trilliifolia	OXTR
Green's hawkweed	Hieracium greenei	HIGR2
greenleaf manzanita	Arctostaphylos patula	ARPA
greensheathed sedge	Carex feta	CAFE2
ground-cone	Boschniakia strobilacea	BOST2
groundsel	Senecio	SENEC
groundsel	Senecio ligulifolius	SELI
grouse huckleberry	Vaccinium scoparium	VASC
hairy honeysuckle	Lonicera hispidula	LOHI
hairy manzanita	Arctostaphylos columbiana	ARCO3
hairy owl-clover	Orthocarpus hispidus	ORHI
hairy rockcress	Arabis hirsuta	ARHI
Hall's bentgrass	Agrostis hallii	AGHA
Hall's sedge	Carex halliana	CAHA2
happlopappus	Haplopappus	HAPLO2
heart-leaf twayblade	Listera cordata	LICO3
heart-leafed arnica	Arnica cordifolia	ARCO
hedge cornbind	Polygonum scandens	POSC2
hedge-nettle	Stachys	STACH
hedgehog dogtail	Cynosorus echinatus	CYEC
Henderson's brodiaea	Brodiaea hendersonii	BRHE
Henderson's fawn-lily	Erythronium hendersonii	ERHE2
Henderson's shooting star	Dodecatheon hendersonii	DOHE

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
hoary falseyarrow	Chaenactis douglasii	CHDO
hoary rockcress	Arabis puberula	ARPU
Holboell's sandwort	Arabis holboellii	ARHO
honeysuckle	Lonicera	LONIC
Hood's sedge	Carex hoodii	CAHO
Hooker's campion	Silene hookeri	SIHO
hot-rock penstemon	Penstemon deustus	PEDE
Howell's fawn-lily	Erythronium howellii	ERHO2
Howell's pedicularis	Pedicularis howellii	PEHO
Howell's rockcress	Arabis platysperma howellii	ARPLH
huckleberry (or blueberry)	Vaccinium	VACCI
huckleberry oak	Quercus vaccinifolia	QUVA
Idaho fescue	Festuca idahoensis	FEID
incense-cedar	Calocedrus decurrens	CADE3
Indian plum	Oemelaria cerasiformis	CECE
Indian-pipe	Monotropa uniflora	MOUN2
Jeffrey pine	Pinus jeffreyi	PIJE
Jones' sedge	Carex jonesii	CAJO
Kentucky bluegrass	Poa pratensis	POPR
Klamath iris	Iris tenax klamathensis	IRTEK
knobcone pine	Pinus attenuata	PIAT
lady-fern	Athyrium filix-femina	ATFI
lanceleaved stonecrop	Sedum lanceolatum	SELA2
lanceleaved stonecrop	Sedum lanceolatum lanceolatum	SELAL
large-flowered agoseris	Agoseris grandiflora	AGGR
large-flowered blue-eyed Mary	Collinsia grandiflora	COGR
large-flowered fringecup	Tellima grandiflora	TEGR
larkspur	Delphinium	DELPH
laurel	Kalmia	KALMI
leafless pyrola	Pyrola aphylla	PYAP
leafy peavine	Lathyrus polyphyllus	LAPO
leafy pedicularis	Pedicularis racemosa	PERA
Leiberg's bluegrass	Poa leibergii	POLE2
Lemmon's needlegrass	Stipa lemmonii	STLE2
Lemmon's penstemon	Penstemon lemmonii	PELE2
Lewis mockorange	Philadelphus lewisii	PHLE2
Lewis's flax	Linum perenne lewisii	LIPEL
lily	Lilium	LILIU
line-leaf fleabane	Erigeron linearis	ERLI
little prince's-pine	Chimaphila menziesii	CHME
littleleaf montia	Montia parvifolia	MOPA
liver-leaf pyrola	Pyrola assarifolia purpurea	PYASP
Lobb's gooseberry	Ribes lobbii	RILO
locoweed	Astragalus	ASTRA
lodgepole pine	Pinus contorta	PICO
long stolon sedge	Carex pensylvanica	CAPE5
long-leaved hawksbeard	Crepis acuminata	CRAC
long-stalked clover	Trifolium longipes	TRLO
lupine	Lupinus	LUPIN

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
Lyall nettle	Urtica dioica lyallii	URDIL
Lyall's anemone	Anemone lyallii	ANLY2
many-flowered lewisia	Lewisia leana	LELE
marbled wild ginger	Asarum hartwegii	ASHA
Martindale's biscuit-root	Lomatium martindalei	LOMA2
meadow death-camas	Zigadenus venenosus	ZIVE
meadow fescue	Festuca pratensis	FEPR
miner's lettuce	Montia perfoliata	MOPE
miner's lettuce	Montia perfoliata depressa	MOPED
mitrewort	Mitella	MITEL
monkey-flower	Mimulus	MIMUL
montia	Montia	MONTI
mountain boykinia	Boykinia major	BOMA
mountain heliotrope	Valeriana sitchensis	VASI
mountain hemlock	Tsuga mertensiana	TSME
mountain monardella	Monardella odoratissima	MOOD
mountain owl-clover	Orthocarpus imbricatus	ORIM
mountain sweet-root	Osmorhiza chilensis	OSCH
mountain woodfern	Dryopteris austriaca	DRAU2
mud sedge	Carex limosa	CALI
naked broomrape	Orobanche uniflora	ORUN
naked-stemmed hawksbeard	Crepis pleurocarpa	CRPL
nettle-leaf giant-hyssop	Agastache urticifolia	AGUR
Nevada cinquefoil	Potentilla glandulosa nevadensis	POGLN
newberry's penstemon	Penstemon newberryi	PENE
nine-leaf biscuit- root	Lomatium triternatum	LOTR
nine-leaf biscuit-root	Lomatium triternatum triternatum	LOTRT
nitgrass asera	Gastridium ventricosum	GAVE2
nodding arnica	Arnica parryi	ARPA3
nodding stickseed	Hackelia deflexa	HADE
northwestern sedge	Carex concinnoides	CACO
Nuttall's sandwort	Arenaria nuttallii	ARNU
obscure bedstraw	Galium ambiguum	GAAM
one-flowered gentian	Gentiana simplex	GESI
one-sided pyrola	Pyrola secunda	PYSE
oniongrass	Melica	MELIC
orange honeysuckle	Lonicera ciliosa	LOCI
Oregon ash	Fraxinus latifolia	FRLA2
Oregon avens	Geum macrophyllum	GEMA
Oregon bedstraw	Galium oreganum	GAOR
Oregon bensonia	Bensoniella oregana	BEOR
Oregon bleedingheartt	Dicentra formosa oregona	DIFOO
Oregon bluebells	Mertensia bella	MEBE
Oregon boxwood	Pachistima myrsinites	PAMY
Oregon fairy-bell	Disporum hookerii oreganum	DIHOO
Oregon iris	Iris tenax	IRTE
Oregon rockcress	Arabis oregana	AROR
Oregon saxifrage	Saxifraga oregana	SAOR
Oregon trillium	Trillium rivale	TRRI

Appendix D. Species List by Common Name.

Common name	Scientific name	CODE
Oregon white oak	Quercus garryana	QUGA
Oregon wood-sorrel	Oxalis oregana	OXOR
Pacific bleedingheart	Dicentra formosa	DIFO
Pacific brome	Bromus pacificus	BRPA
Pacific dogwood	Cornus nuttallii	CONU
Pacific hound's-tongue	Cynoglossum grande	CYGR
Pacific madrone	Arbutus menziesii	ARME
Pacific ninebark	Physocarpus capitatus	PHCA3
Pacific rhododendron	Rhododendron macrophyllum	RHMA
Pacific waterleaf	Hydrophyllum tenuipes	HYTE
Pacific yew	Taxus brevifolia	TABR
paintbrush	Castilleja	CASTI
pale bentgrass	Agrostis alba	AGAL
pale fawn-lily	Erythronium grandiflorum	ERGR
pale montia	Montia spathulata	MOSP
Parry's rush	Juncus parryi	JUPA
parsley-fern	Cryptogramma crispa	CRCR
pearly-everlasting	Anaphalis	ANAPH
peavine	Lathyrus	LATHY
penstemon	Penstemon	PENST
penstemon	Penstemon parvulus	PEPA3
pepperwort	Lepidium latifolium	LELA
phacelia	Phacelia corymbosa	PHCO3
phantom-orchid	Eburophyton austinae	EBAU
pine bluegrass	Poa scabrella	POSC
pine woods cryptantha	Cryptantha simulans	CRSI
pine-foot	Pityopus californica	PICA
pinedrops	Pterospora andromedea	PTAN
pinemat manzanita	Arctostaphylos nevadensis	ARNE
pinesap	Hypopitys monotropas	HYMO
pinesap	Monotropa hypopithys	MOHY
Piper's Oregongrape	Berberis piperiana	BEPI
poison oak	Rhus diversiloba	RHDI
polypody	Polypodium	POLYP
ponderosa pine	Pinus ponderosa	PIPO
Port-Orford-cedar	Chamaecyparis lawsoniana	CHLA
prairie junegrass	Koelaria cristata	KOCR
prickly currant	Ribes lacustre	RILA
Purdy's stonecrop	Sedum purdyi	SEPU2
purple godetia	Clarkia purpurea	CLPU2
purple sweet-root	Osmorhiza purpurea	OSPU
purple-flower honeysuckle	Lonicera conjugialis	LOCO
pussypaws	Spraguea umbellata	SPUM
pygmy hollygrape	Berberis pumila	BEPU
Queen's cup	Clintonia uniflora	CLUN
Rattan blue-eyed Mary	Collinsia rattanii	CORA2
rayless arnica	Arnica discoidea	ARDI
red alder	Alnus rubra	ALRU
red columbine	Aquilegia formosa	AQFO

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Common name	Scientific name	CODE
red elderberry	Sambucus arborescens	SAAR5
red elderberry	Sambucus racemosa	SARA
red elderberry	Sambucus racemosa arborescens	SARAA
red fescue	Festuca rubra	FERU
red huckleberry	Vaccinium parvifolium	VAPA
red-flowering currnat	Ribes sanguineum	RISA
red-osier dogwood	Cornus stolonifera	COST
redstem ceanothus	Ceanothus sanguineus	CESA
redwoods violet	Viola sempervirens	VISE
rhombic-petaled clarkia	Clarkia rhomboidea	CLRH
rigid willow-herb	Epilobium rigidum	EPRI
river bullrush	Scirpus fluviatilis	SCFL
rockcress	Arabis	ARABI
Rocky Mountain maple	Acer glabrum	ACGL
rose	Rosa	ROSA
rough wallflower	Erysimum asperum	ERAS
round-leaved violet	Viola orbiculata	VIOR2
rusty menziesia	Menziesia ferruginea	MEFE
rusty popcorn-flower	Plagiobothrys nothofulvus	PLNO
Sadler oak	Quercus sadleriana	QUSA
salal	Gaultheria shallon	GASH
salmonberry	Rubus spectabilis	RUSP
samll-flowered willow-herb	Epilobium minutum	EPMI
Sandberg's bluegrass	Poa sandbergii	POSA3
sandwort	Arenaria	ARENA
saxifrage	Saxifraga	SAXIF
scarlet gilia	Gilia aggregata	GIAG
Scouler's harebell	Campanula scouleri	CASC2
sedge	Carex	CAREX
sharptooth angelica	Angelica arguta	ANAR2
Shasta fern	Polystichum mohriodes	POMO3
Shasta red fir	Abies magnifica shastensis	ABMAS
sheep fescue	Festuca ovina	FEOV
shiny frasera	Frasera albicaulis nitida	FRALN
shinyleaf gooseberry	Ribes cruentum	RICR
showy aster	Aster conspicuus	ASCO
showy phlox	Phlox speciosa	PHSP
showy tarweed	Madia elegans	MAEL
shrubby everlasting	Antennaria suffretescens	ANSU
Siberian montia	Montia sibirica	MOSI
Siberian montia	Montia sibirica bulbifera	MOSIB
Siberian montia	Montia sibirica sibirica	MOSIS
sickle-keeled lupine	Lupinus albicaulis	LUAL
sickle-leaved onion	Allium falcifolium	ALFA
Sierra laurel	Leucothoe davisiae	LEDA
silky horkelia	Horkelia sericata	HOSE
Siskiyou gooseberry	Ribes binominatum	RIBI
Siskiyou onion	Allium siskiyouense	ALSI3
sitka alder	Alnus sinuata	ALSI

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Common name	Scientific name	CODE
Sitka mountain-ash	Sorbus sitchensis	SOSI
skunkleaf polemonium	Polemonium pulcherrimum	POPU
slender boykinia	Boykina elata	BOEL
slender campion	Silene campanulata	SICA2
slender campion	Silene campanulata glandulosa	SICAG
slender godetia	Clarkia gracilis	CLGR
slender salal	Gaultheria ovatifolia	GAOV
slender toothwort	Cardamine pulcherrima	CAPU
slender toothwort	Cardamine pulcherrima pulcherrima	CAPUP
slender toothwort	Cardamine pulcherrima tenella	CAPUT
slender-tubed iris	Iris chrysophylla	IRCH
small bedstraw	Galium trifidum	GATR
small flowered woodrush	Luzula parviflora	LUPA
small goldfields	Baeria minor	BAMI
small-flowered blue-eyed Mary	Collinsia parviflora	COPA
small-flowered deervetch	Lotus micranthus	LOMI
small-flowered nemophila	Nemophila parviflora	NEPA
small-flowered tonella	Tonella tenella	TOTE
smallflower alumroot	Heuchera micrantha	HEMI
smallflower alumroot	Heuchera micrantha micrantha	HEMIM
smallflower fringecup	Lithophragma parviflora	LIPA
Smith fairy-bell	Disporum smithii	DISM
snakeweed	Polygonum bistortoides	POBI
snow bramble	Rubus nivalis	RUNI
snow cinquefoil	Potentilla quinquefolia	POQU
snow plant	Sarcodes sanguinea	SASA2
snow-queen	Synthyris reniformis	SYRE
snowbrush ceanothus	Ceanothus velutinus	CEVE
spatula-leaf stonecrop	Sedum spathulifolium	SESP
spotted coral-root	Corallorhiza maculata	COMA3
spreading dogbane	Apocynum androsaemifolium	APAN
spreading phlox	Phlox diffusa	PHDI
squawcarpet ceanothus	Ceanothus prostratus	CEPR
starry Solomon-plume	Smilacina stellata	SMST
stemless morning glory	Convolvulus subacaulis	COSU
sticky cinquefoil	Potenitilla glandulosa glandulosa	POGLG
sticky cinquefoil	Potentilla glandulosa	POGL
sticky currant	Ribes viscosissimum	RIVI
stonecrop	Sedum	SEDUM
strawberry	Fragaria	FRAGA
stream violet	Viola glabella	VIGL
striped coral-root	Corallorhiza striata	COST2
subalpine fir	Abies lasiocarpa	ABLA
sugar pine	Pinus lambertiana	PILA
Suksdorf's brome	Bromus suksdorfii	BRSU
sulphur buckwheat	Eriogonum umbellatum	ERUM
sulphur buckwheat	Eriogonum umbellatum polyanthum	ERUMP
sulphur buckwheat	Eriogonum umbellatum stellatum	ERUMS
sweet fennel	Foeniculum vulgare	FOVU

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Common name	Scientific name	CODE
sword-fern	Polystichum	POLYS
sword-fern	Polystichum munitum	POMU
Sylvan goatsbeard	Aruncus sylvester	ARSY
tall buckwheat	Eriogonum elatum	EREL2
tall gray rabbitbrush	Chrysothamnus nauseosus	CHNA
tall oatgrass	Arrhenatherum elatus	AREL
tall Oregongrape	Berberis aquifolium	BEAQ
tanoak	Lithocarpus densiflorus	LIDE3
Thale cress	Arabidopsis thaliana	ARTH
thimbleberry	Rubus parviflorus	RUPA
thin-leaved huckleberry	Vaccinium membranaceum	VAME
thinleaf bedstraw	Galium bifolium	GABI
three-tooth mitrewort	Mitella trifida	MITR2
threeleaf anemone	Anemone deltoidea	ANDE
Tolmie's cats-ear	Calochortus tolmiei	CATO
Tolmie's onion	Allium tolmiei	ALTO
tongue-leaved penstemon	Penstemon anguineus	PEAN
toothleaf pyrola	Pyrola dentata	PYDE
towermustard	Arabis glabra	ARGL
trail-plant	Adenocaulon bicolor	ADBI
trailing blackberry	Rubus ursinus	RUUR
trefoil foamflower	Tiarella trifoliata trifoliata	TITRT
trisetum	Trisetum	TRISE
tufted hairgrass	Deschampsia caespitosa	DECA
twayblade	Listera	LISTE
two-color lupine	Lupinus bicolor	LUBI
vanillaleaf	Achlys triphylla	ACTR
variable morning-glory	Convolvulus polymorphus	COPO
varied-leaf collomia	Collomia heterophylla	COHE
varied-leaf nemophila	Nemophila heterophylla	NEHE
varileaf phacelia	Phacelia heterophylla	PHHE
varileaf phacelia	Phacelia heterophylla pseudohispida	PHHEP
velvet lupine	Lupinus leucophyllus	LULE
vetch	Vicia	VICIA
vine maple	Acer circinatum	ACCI
violet	Viola	VIOLA
wall rockcress	Arabis aculeolata	ARAC
Washington lily	Lilium washingtonianum	LIWA
waterleaf	Hydrophyllum	HYDRO
wax currant	Ribes cereum	RICE
wedgeleaf ceanothus	Ceanothus cuneatus	CECU
wedgeleaf violet	Viola cuneata	VICU
western azalea	Rhododendron occidentale	RHOC
western blue flax	Linum lewisii	LILE
western buttercup	Ranunculus occidentalis	RAOC
western buttercup	Ranunculus occidentalis occidentalis	RAOCO
western coral-root	Corallorhiza mertensiana	COME
western dock	Rumex occidentalis	RUOC2
western fescue	Festuca occidentalis	FEOC

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Common name	Scientific name	CODE
western groundsel	Senecio integerrimus	SEIN
western hemlock	Tsuga heterophylla	TSHE
western hound's-tongue	Cynoglossum occidentale	CYOC
western maidenhair-fern	Adiantum pedatum	ADPE
western mugwort	Artemisia ludoviciana	ARLU
western prince's-pine	Chimaphila umbellata	CHUM
western rattlesnake-plantain	Goodyeara oblongifolia	GOOB
western redcedar	Thuja plicata	THPL
western serviceberry	Amelanchier alnifolia	AMAL
western Solomon-plume	Smilacina racemosa	SMRA
western starflower	Trientalis latifolia	TRLA2
western sweet-root	Osmorhiza occidentalis	OSCC
western tansymustard	Descurainia pinnata	DEPI
western twayblade	Listera caurina	LICA3
western twinflower	Linnaea borealis longiflora	LIBOL
western white pine	Pinus monticola	PIMO
western wild grape	Vitis californica	VICA3
western yellow wood-sorrel	Oxalis suksdorfii	OXSU
whipplevine	Whipplea modesta	WHMO
white bog-orchid	Habenaria dilatata	HADI2
white fir	Abies concolor	ABCO
white inside-out-flower	Vancouveria hexandra	VAHE
white marshmarigold	Caltha biflora biflora	CABIB
white trillium	Trillium ovatum	TROV
white vein pyrola	Pyrola picta	PYPI
white-flowered hawkweed	Hieracium albiflorum	HIAL
white-flowered rush-lily	Schoenolirion album	SCAL
white-leaved lupine	Lupinus albifrons	LUAL2
whiteleaf Fendler's waterleaf	Hydrophyllum fendleri albifrons	HYFEA
whiteleaf manzanita	Arctostaphylos viscida	ARVI
whiteleaf phacelia	Phacelia hastata	PHHA
wild ginger	Asarum caudatum	ASCA3
wild onion	Allium	ALLIU
wild sarsaparilla	Aralia	ARALI
wildrye	Elymus	ELYMU
willow	Salicaceae	SALIX
willow-herb	Epilobium	EPILO
wood saxifrage	Saxifraga mertensiana	SAME3
woodland beard-tongue	Nothochelone nemorosa	NONE
woodland phlox	Phlox adsurgens	PHAD
woodland tarweed	Madia madioides	MAMA
woods strawberry	Fragaria vesca bracteata	FRVEB
woolly sunflower	Eriophyllum lanatum	ERLA
woolly-head clover	Trifolium eriocephalum	TRER
yellow bell	Fritillaria pudica	FRPU
yellow fawn-lily	Erythronium grandiflorum grandiflorum	ERGRG
yellow inside-out-flower	Vancouveria chrysantha	VACH
yellow monkey-flower	Mimulus guttatus	MIGU
yerba buena	Satureja douglasii	SADO